DEKRA Certification, Inc.
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United States of America

FCC LISTED, REGISTRATION NUMBER: 2764.01

ISED LISTED REGISTRATION NUMBER: 23595-1

Test report No:
3231ERM.010

Test report

USA FCC Part 15.247, 15.209, 15.207
CANADA RSS-247, RSS-Gen
Radio Frequency Devices. Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz.
Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices.

Identification of item tested	In vehicle infotainment
Trademark	Visteon
Model and /or type reference	CRONY 2010
Other identification of the product	FCC ID: NT8-CRONY2010
Features	AM/FM receiver, BT EDR, WiFi@5 GHz 802.11a/n20/n40/ac80, GNSS/GPS
Manufacturer	Visteon Corporation One Village Center Drive, Van Buren Township, MI 48111, USA
Test method requested, standard	USA FCC Part 15.247, 10-1-20 Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz USA FCC Part 15.209, 10-1-20 Edition: Radiated emission limits; general requirements CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-Gen Issue 5 (February 2021). Guidance for Compliance Measurements on Digital Transmission Systems, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating Under section §15.247 of the FCC Rules 558074 D01 15.247 Meas. Guidance v05r02 (April 2019). ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager Digitally signed by Domingo Galvez DN: cn=Domingo Galvez, o=DEKRA Certification Inc., ou=Regulatory Lab, email=dgalvez@dekra.com, c=US Date: 2022.02.15 18:46:34 -05'00'
Date of issue	02/15/2022
Report template No	FDT30_18

Index

Competences and guarantees

DEKRA Certification Inc. is a testing laboratory accredited by A2LA (The American Association for Laboratory Accreditation), to perform the tests indicated in the Certificate 2764.01

DEKRA Certification Inc. is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Certification Inc. has a calibration and maintenance program for its measurement equipment.

DEKRA Certification Inc. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Certification at the time of performance of the test.

DEKRA Certification Inc. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Certification Inc.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Certification Inc. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Certification internal document PODT000.

Frequency (MHz)	U(k=2)	Units
30-180	3.82	dB
180-1000	2.61	dB
1000-18000	2.92	dB
18000-40000	2.15	dB

Data provided by the client

An in-vehicle infotainment system that combines entertainment and information delivery for driver and passengers. This system consists of features like AM/FM Radio, GPS, RVC, USB & BT/WiFi interfaces with 10.25 Inch TFT & Touch screen interface.

This Infotainment can allow a driver to perform a number of tasks, such as standard radio and listen to music over a USB flash drive or Bluetooth, hands-free phone connections to make phone calls, vehicle voice commands, and other types of Interactive audio or video.

DEKRA declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples used for testing have been selected by **The Client.**

Sample S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
3231/03	Conducted BT Radio	VPNPLF-18C815-CB	-	12/17/2021
3231/37	Harness + Speaker board	PSSA-AEE2010	-	12/17/2021

Following Auxiliary items were used with Sample S/01 to perform testing:

Control Nº	Description	Model	Serial Nº	Date of reception
3231/22	USB type A (Male) to DB9 cable	-	-	12/17/2021
3231/26	Adapter USB-Type A (Female) to USB-Mini A	-	-	12/17/2021
3231/27	Adapter USB 3.0 to Gigabit Ethernet	UE300	-	12/17/2021

1. Sample S/01 was used for the following test(s): All Conducted tests indicated in appendix A

Sample S/02 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
3231/11	Radiated BT Radio	VPNPLF-18C815-CB	-	12/17/2021
3231/35	Harness	PSSA-AEE2010	-	12/17/2021

Following Auxiliary items were used with Sample S/02 to perform testing:

Control Nº	Description	Model	Serial Nº	Date of reception
3231/15	GPS Antenna	PP GF30	2210910950	12/17/2021
3231/16	Antenna	A0056I-01	3017417509121	12/17/2021
3231/21	USB type A (Male) to DB9 cable	-	-	12/17/2021
3231/30	Adapter USB 3.0 to Gigabit Ethernet	UE300	-	12/17/2021

1. Sample S/02 was used for the following test(s): All Radiated tests indicated in appendix A

Test sample description

Ports..... :	Port name and description	Cable				
		Specified length [m]	Attached during test	Shielded	Coupled to patient	
	Main connector		☐	☐	☐	
	USB OTG		☐	☐	☐	
	GPS Antenna FAKRA connector		☐	☐	☐	
	AM/FM Antenna FAKRA connector		☐	☐	☐	
Supplementary information to the ports..... :	No Data Provided					
Rated power supply .....:	Voltage and Frequency	Reference poles				
		L1	L2	L3	N	PE
	☐ AC:	☐	☐	☐	☐	☐
	☐ AC:	☐	☐	☐	☐	☐
	☒ DC: 13.5 V vehicle battery					
	☐ DC:					
Rated Power .....:	Nominal current 3A					
Clock frequencies .....:	DDR3 800 MHz, NAND Memory 100 MHz, TFT 298.5 kHz, LVDS 39.4 MHz, IMX8 1,2 GHz					
Other parameters.....:	No Data Provided					
Software version .....:	26381					
Hardware version.....:	08.01.01					
Dimensions in cm (W x H x D)....:	(285.2 x 135.5 x 197.5) mm					
Mounting position.....:	☐ *Table top equipment*					
	☐ *Wall/Ceiling mounted equipment*					
	☐ *Floor standing equipment*					
	☐ *Hand-held equipment*					
	☒ *Other: Installed in vehicle dashboard*					
Modules/parts .....:	Module/parts of test item	Type	Manufacturer			
	Commercial samples					
	Radiated samples					

	Conducted samples		

Accessories (not part of the test item) .....:	Description	Type	Manufacturer
	Harness		
	AM/FM Antenna		
	GPS antenna		
	Speakers		
	Test panel		
	USB convertors		
Documents as provided by the applicant.....:	Description	File name	Issue date
	Declaration Equipment	FDT30_18 Declaration Equipment Data 12/17/2021	01/06/2022
	General description Crony 2010		01/06/2022
	FERMUSA201_0 test samples Questionnaire		

Copy of marking plate:

Identification of the client

Visteon Corporation
One Village Center Drive,
Van Buren Township, MI 48111, USA

Testing period and place

Test Location	DEKRA Certification Inc.
Date (start)	01-10-2022
Date (finish)	02-08-2022

Document history

Report number	Date	Description
3231ERM.010	02-15-2022	First release

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the semi-anechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

1. The tests have been performed by the technical personnel: Sravani Gollamudi, Juliana Cherry, Yuri Barone, Koji Nishimoto and Cheikhna Ouattara.

Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

Summary

FCC PART 15 PARAGRAPH / RSS-247 (Bluetooth BR/EDR)					
Section	**15.247 Spec Clause**	**RSS Spec Clause**	**Test Description**	**Verdict**	**Remark**
A.1	§ 2.1049 & § 15.247 (a) (1)	RSS-247 5.1 (b)	20dB Emission Bandwidth, Occupied Bandwidth & Carrier Frequency Separation	P	N/A
A.2	§ 15.247 (a) (1) (iii)	RSS-247 5.1 (d)	Number of hopping channels	P	N/A
A.3	§ 15.247 (a) (1) (iii)	RSS-247 5.1 (d)	Time of Occupancy (Dwell Time)	P	N/A
A.4	§ 15.247 (b) (3)	RSS-247 5.4 (b)	Maximum peak conducted output power and antenna gain	P	N/A
A.5	§ 15.247 (d)	RSS-247 5.5	Band-edge conducted emissions compliance (Transmitter)	P	N/A
A.6	§ 15.247 (d)	RSS-247 5.5	Emission limitations Conducted (Transmitter)	P	N/A
A.7	§ 15.247 (d)	RSS-247 5.5	Emission limitations Radiated (Transmitter)	P	N/A
Supplementary information and remarks: N/A					

List of equipment used during the test

Conducted Measurements

Test system Rohde & Schwarz TS 8997:

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
1038	TS8997 TEST SYSTEM	Rohde & Schwarz	TS8997	N/A	N/A
1107	ETHERNET SNMP THERMOMETER	HW GROUP	HWg-STE Plain	2020/08	2022/08
1313	WIRELESS MEASUREMENT SOFTWARE R&S WMS32	Rohde & Schwarz	N/A	N/A	N/A

Radiated Measurements

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
0981	RF pre-amplifier	Bonn Elektronik	BLMA0118-2A	2020/11	2022/11
1010	ESR7 EMI Test Receiver	Rohde & Schwarz	ESR7	2020/10	2022/10
1014	Spectrum analyzer	Rohde & Schwarz	FSV40	2021/05	2023/05
1056	Double-ridge Waveguide Horn antenna 18-40 GHz	ETS LINDGREN	3116C	2020/01	2023/01
1057	Double-ridge Waveguide Horn antenna 1-18 GHz	ETS LINDGREN	3115	2020/06	2023/06
1065	BiconicalLog antenna	ETS LINDGREN	3142E	2020/08	2023/08
1111	ETHERNET SNMP THERMOMETER	HW GROUP	HWg-STE Plain	2020/08	2022/08
1179	Semi anechoic Absorber Lined Chamber	Frankonia	SAC 3 plus “L”	N/A	N/A
1314	WIRELESS MEASUREMENT SOFTWARE R&S EMC32	Rohde & Schwarz	N/A	N/A	N/A

Appendix A: Test results (Bluetooth BR/EDR)

Appendix A Content

PRODUCT INFORMATION

The following information is provided by the client

Information	Description
Modulation	BR/EDR: GFSK, π/4-DQPSK, 8DPSK
Operating Frequency Range	2402 – 2480 MHz
Nominal Channel Bandwidth	1 MHz
RF Output Power	9,8 dBm
Extreme operating conditions	-
- Temperature range	-
Antenna type	Automotive Chip Antenna 2,4/5 GHz
Antenna gain	3.2 dBi
Nominal Voltage	
- Supply Voltage	13.5 Vdc
- Type of power source	DC voltage
Equipment type	Bluetooth BR/EDR
Geo-location capability	-

DESCRIPTION OF TEST CONDITIONS

TEST CONDITIONS	DESCRIPTION
TC#01	Power supply (V): $V_{nominal}$ = 13.5 Vdc Modulation: GFSK Test Frequencies for conducted/Radiated tests: Lowest range: 2402 MHz Middle channel: 2441 MHz Highest range: 2480 MHz
TC#02	Power supply (V): $V_{nominal}$ = 13.5 Vdc Modulation: π/4-DQPSK Test Frequencies for Conducted/Radiated tests: Lowest range: 2402 MHz Middle channel: 2441 MHz Highest range: 2480 MHz
TC#03	Power supply (V): $V_{nominal}$ = 13.5 Vdc Modulation: 8-DPSK Test Frequencies for Conducted/Radiated tests: Lowest range: 2402 MHz Middle channel: 2441 MHz Highest range: 2480 MHz

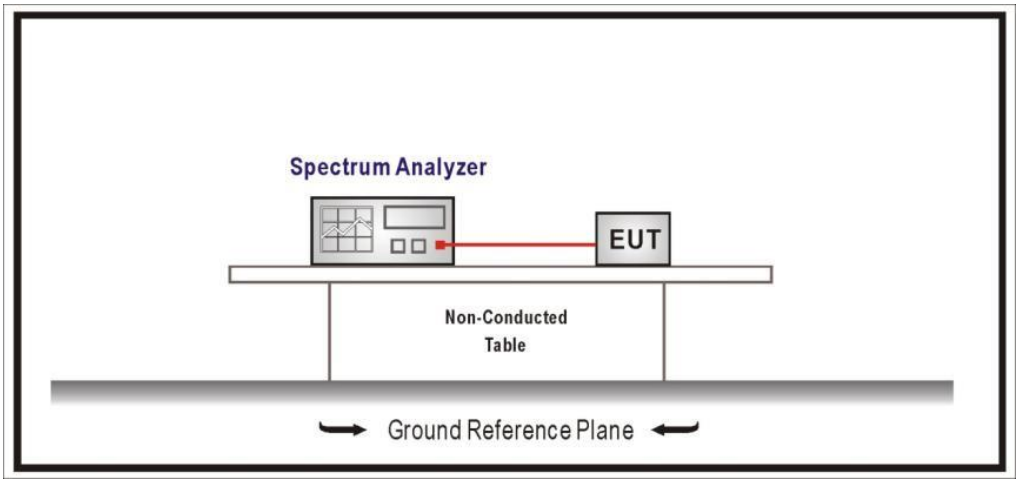
TEST A.1: 20DB EMISSION BANDWIDTH, OCCUPIED BANDWIDTH AND CARRIER FREQUENCY SEPARATION

LIMITS:	Product standard:	§ 2.1049, Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(a) (1) and RSS-247 5.1 (b)

LIMITS

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST SETUP:	



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

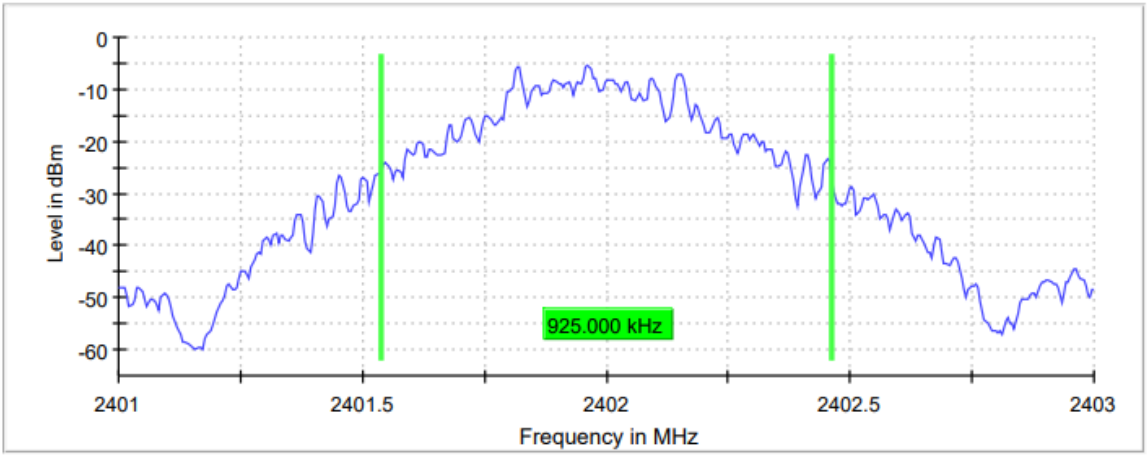
	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
20dB Bandwidth (kHz)	925	925	925
Occupied bandwidth (kHz)	850	845	845

Measurement Set up

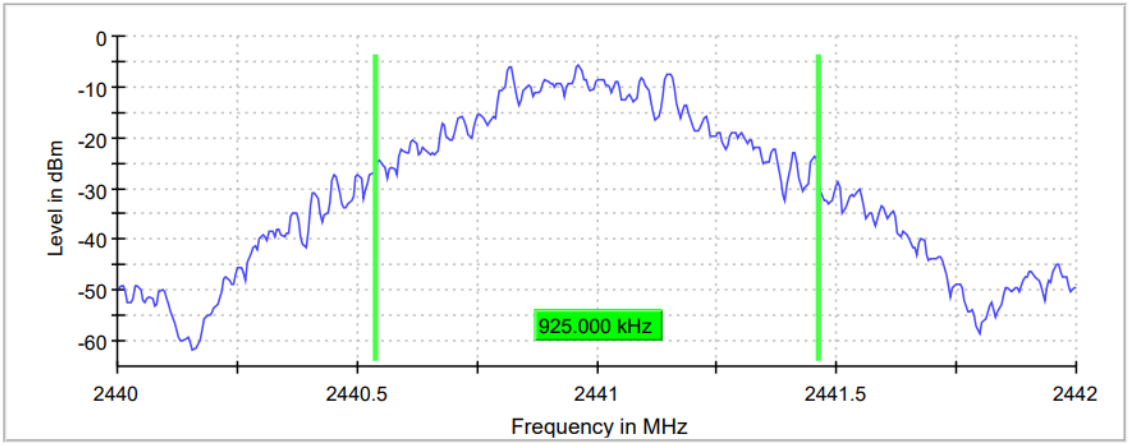
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 µs	189.648 µs	189.648 µs
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	200	200	200
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.50 dB
Run	13 / max. 150	17/ max. 150	11 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.09 dB	0.12 dB	0.02 dB

TEST RESULTS (Cont.):	20 dB BANDWIDTH

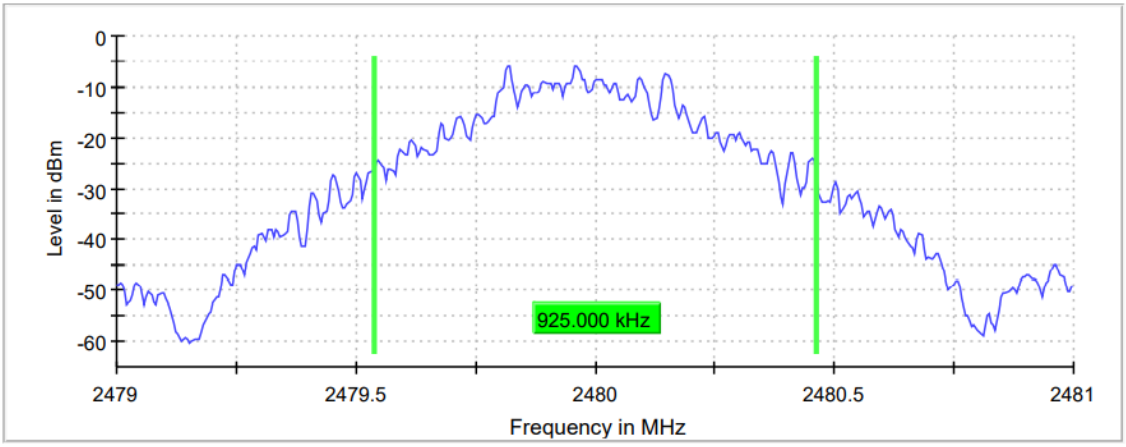
Lowest Channel



Middle Channel

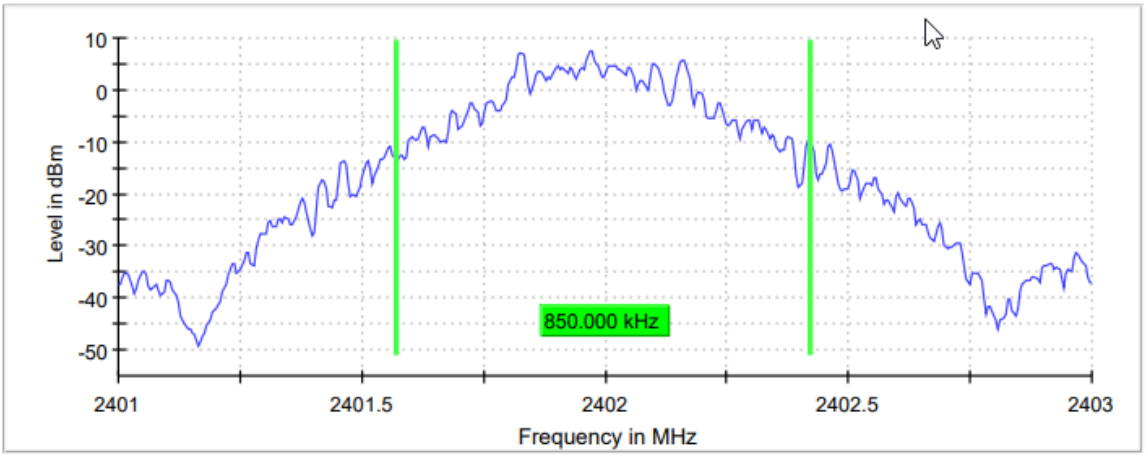


Highest Channel

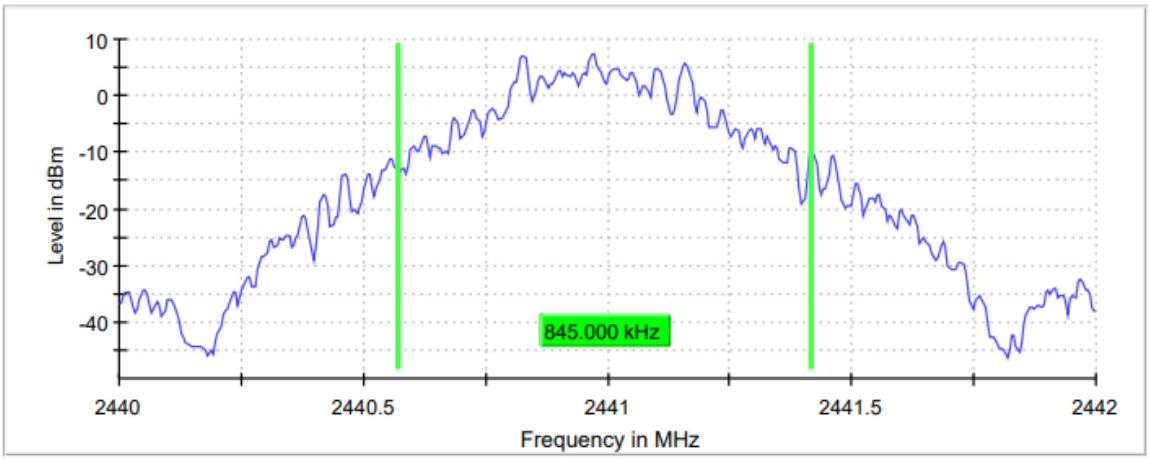


TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

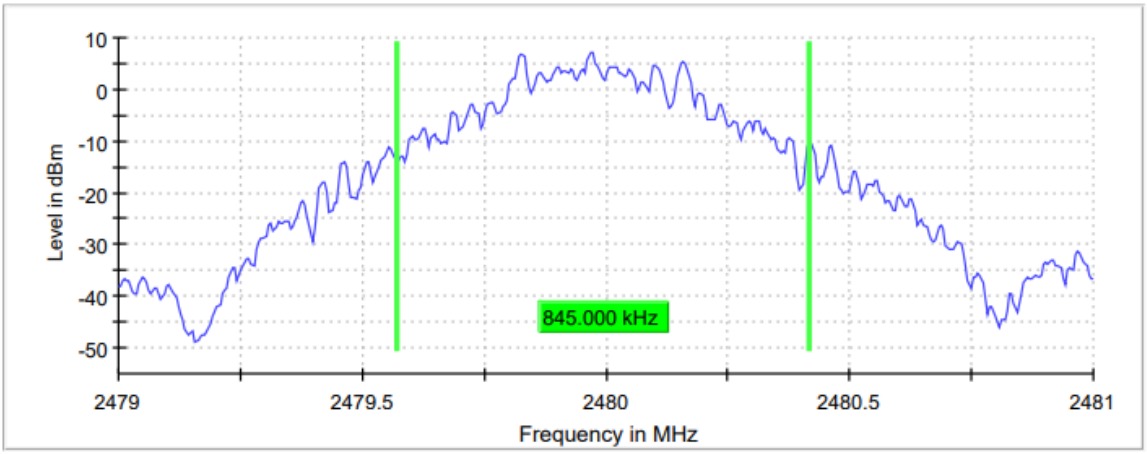
Lowest Channel



Middle Channel



Highest Channel

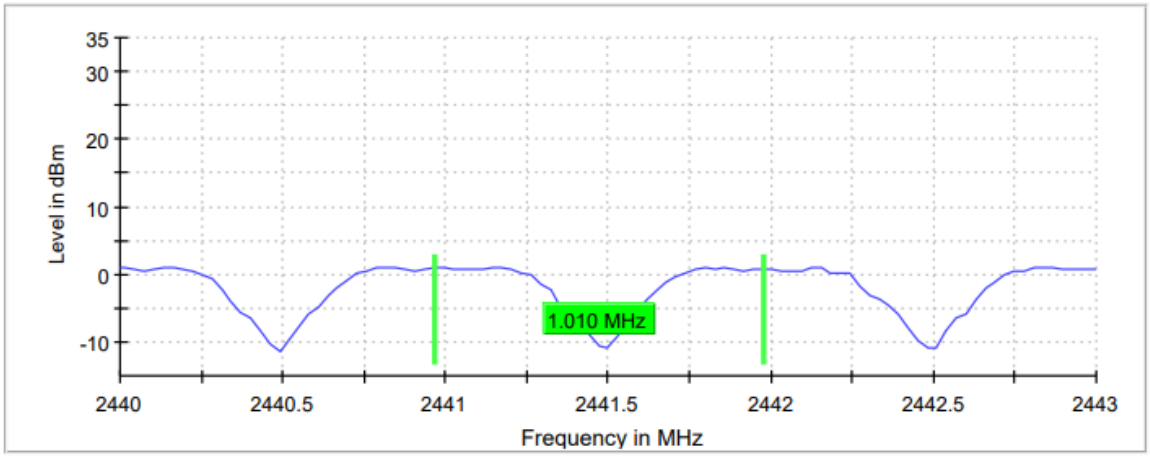


TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

Measurement Set- up

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 µs	189.648 µs	189.648 µs
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	500	500	500
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.30 dB	0.30 dB	0.30 dB
Run	6 / max. 150	6 / max. 150	7 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.06 dB	0.08 dB	0.11 dB

TEST RESULTS (Cont.)	CARRIER FREQUENCY SEPARATION



The hopping channel carrier frequencies are separated by a minimum of the two-thirds of the 20dB bandwidth of the hopping channel.

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02
TEST RESULTS:	PASS

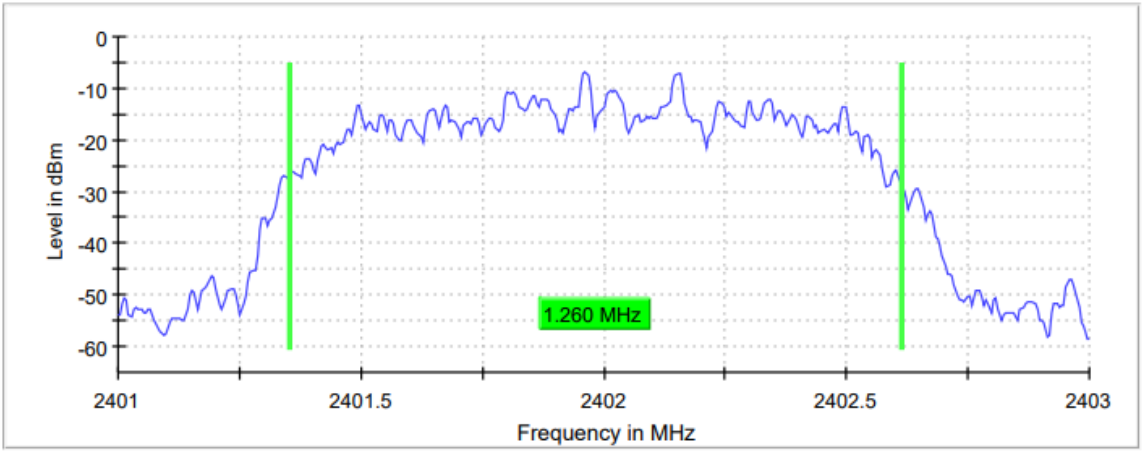
	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
20dB bandwidth (MHz)	1.260	1.260	1.260
Occupied bandwidth (MHz)	1.155	1.150	1.150

Measurement Setup

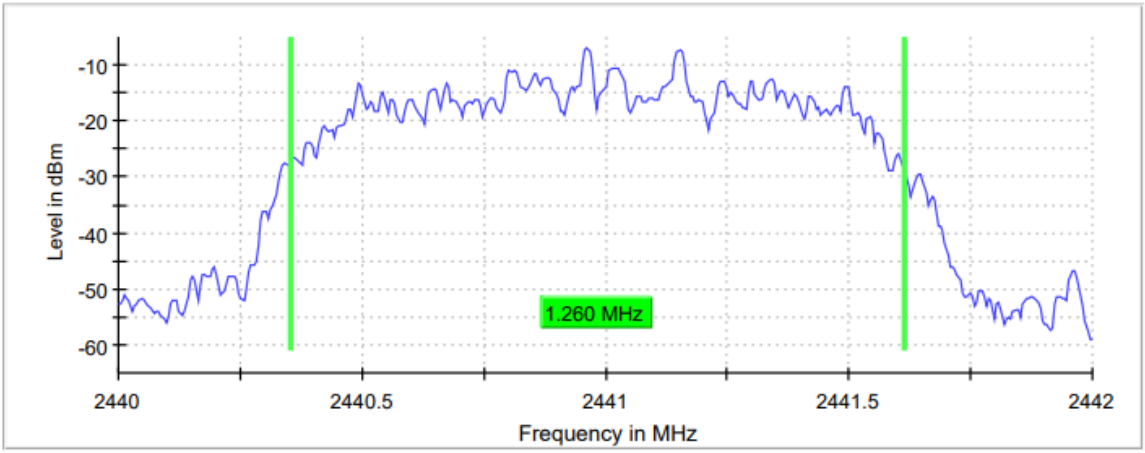
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44100 GHz	2.48100 GHz
Span	2.00 MHz	2.00 MHz	2.00 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 µs	189.648 µs	189.648 µs
Reference Level	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	200	200	200
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.50 dB
Run	8 / max. 150	8 / max. 150	10 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.15 dB	0.07 dB	0.12 dB

TEST RESULTS (Cont.):	20 dB BANDWIDTH

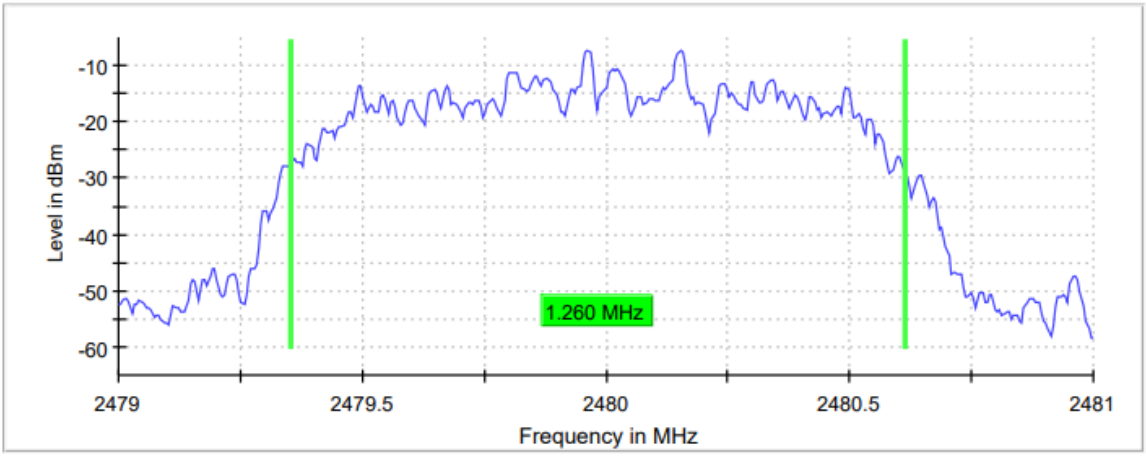
Lowest Channel



Middle Channel

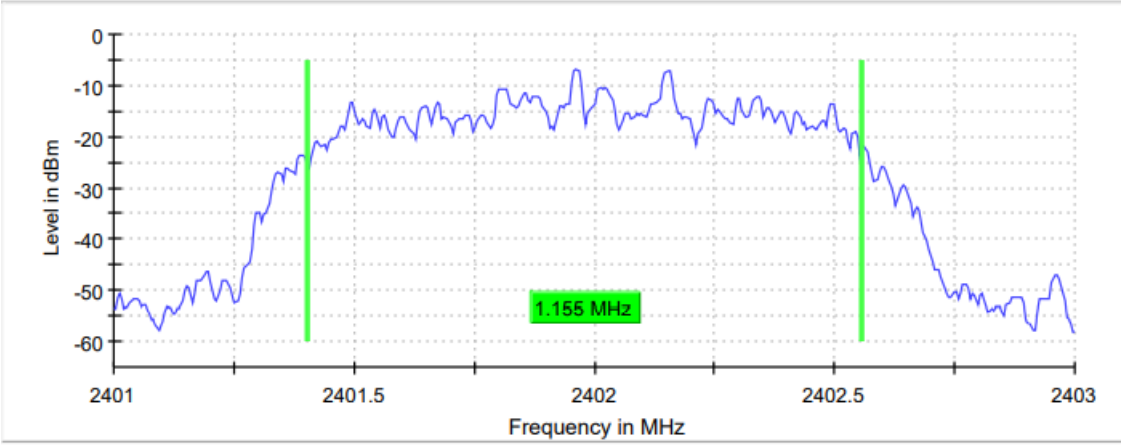


Highest Channel

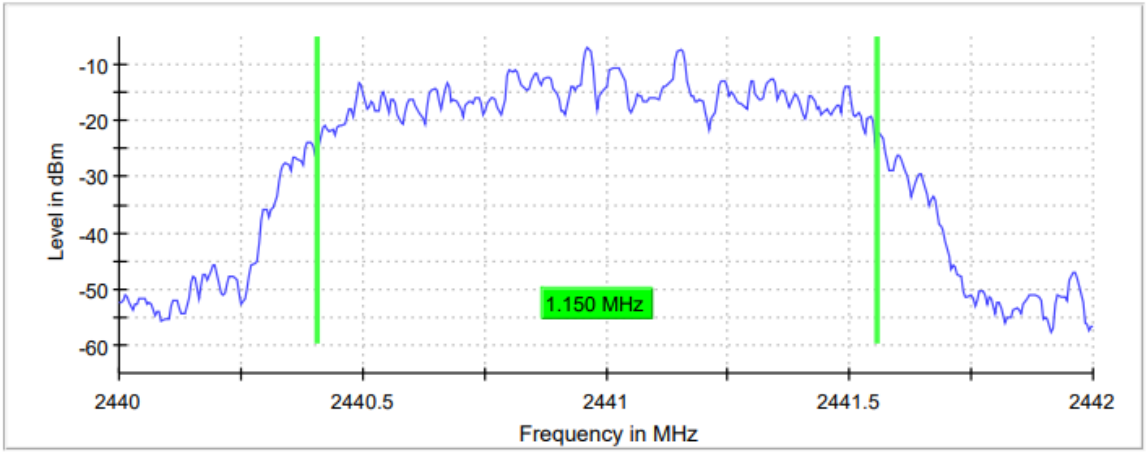


TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

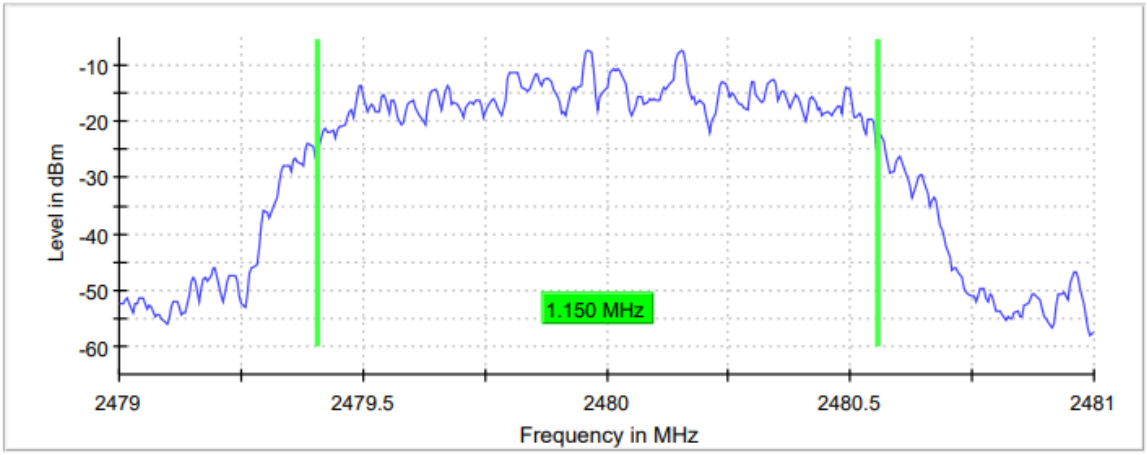
Lowest Channel



Middle Channel



Highest Channel

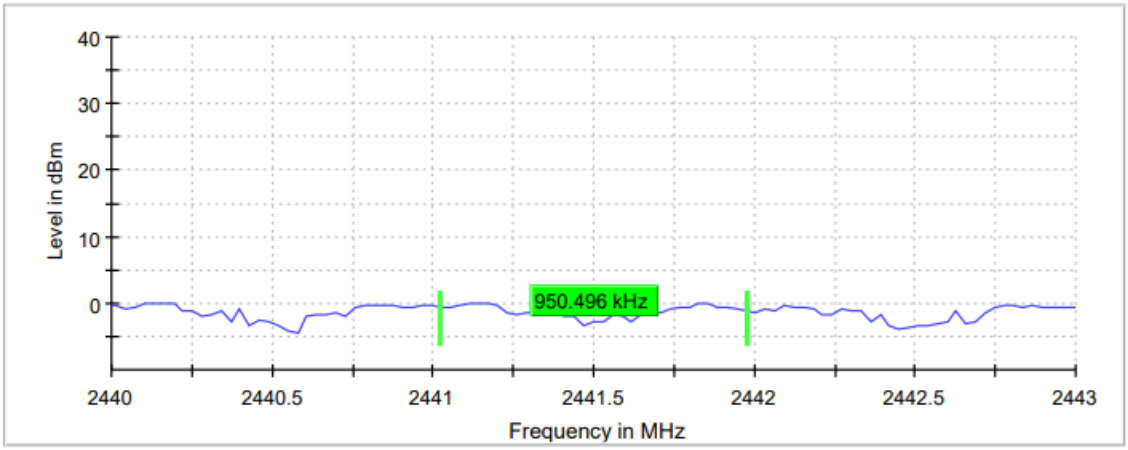


TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

Measurement Set- up

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 µs	189.648 µs	189.648 µs
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	500	500	500
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.30 dB	0.30 dB	0.30 dB
Run	12 / max. 150	6 / max. 150	6 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.09 dB	0.04 dB	0.05 dB

TEST RESULTS (Cont.)	CARRIER FREQUENCY SEPARATION



The hopping channel carrier frequencies are separated by a minimum of the two-thirds of the 20 dB bandwidth of the hopping channel.

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03
TEST RESULTS:	PASS

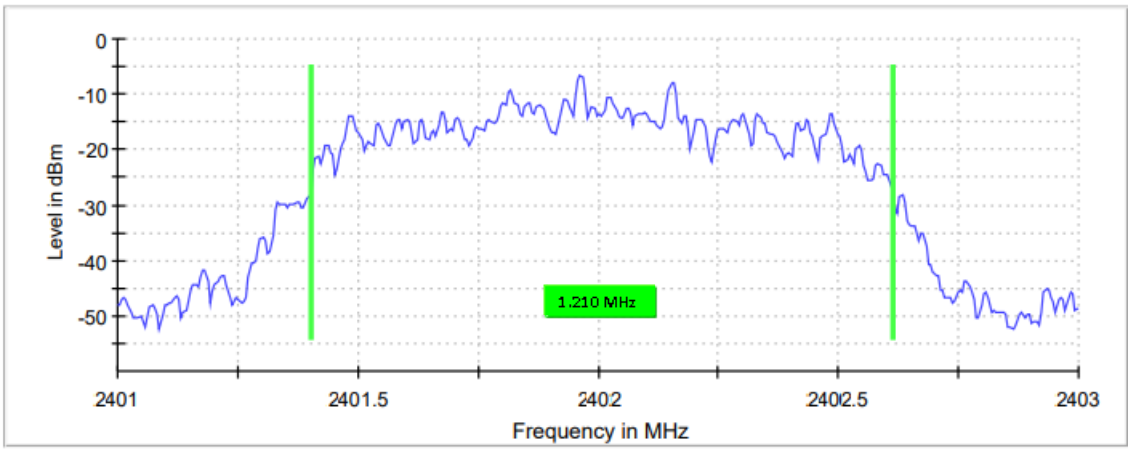
	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
20dB bandwidth (MHz)	1.210	1.210	1.210
Occupied bandwidth (MHz)	1.155	1.155	1.155

Measurement Setup

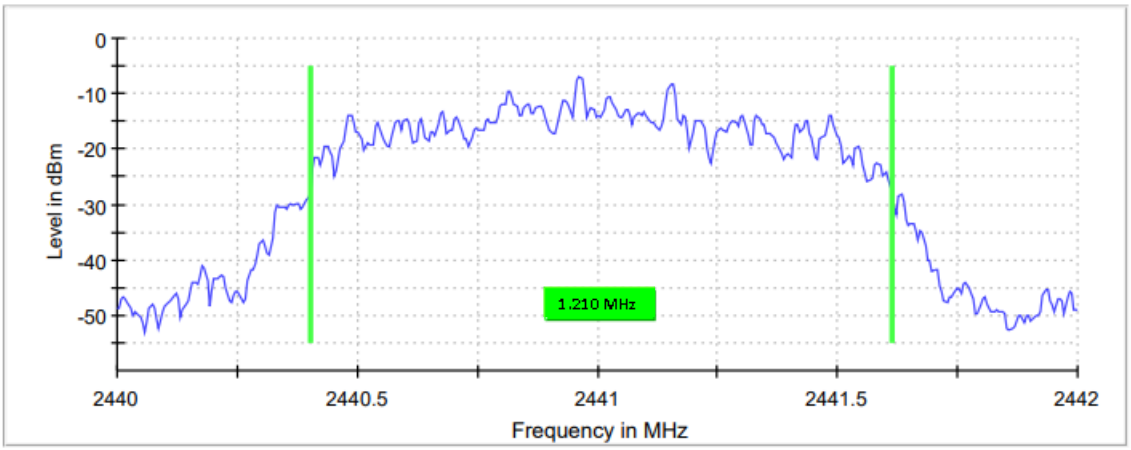
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44100 GHz	2.48100 GHz
Span	2.00 MHz	2.00 MHz	2.00 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 µs	189.648 µs	189.648 µs
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	200	200	200
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.50 dB
Run	11 / max. 150	11 / max. 150	13 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.09 dB	0.09 dB	0.11 dB

TEST RESULTS (Cont.):	20 dB BANDWIDTH

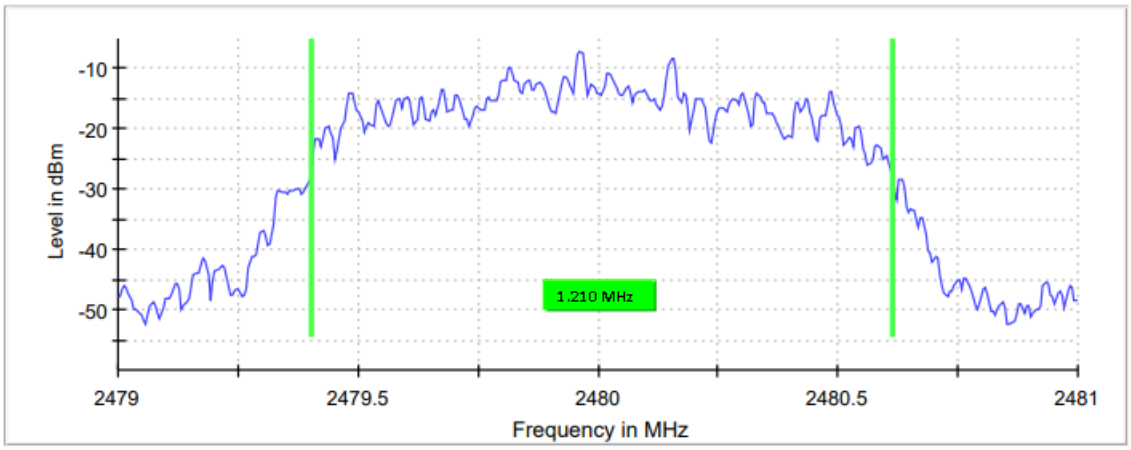
Lowest Channel



Middle Channel

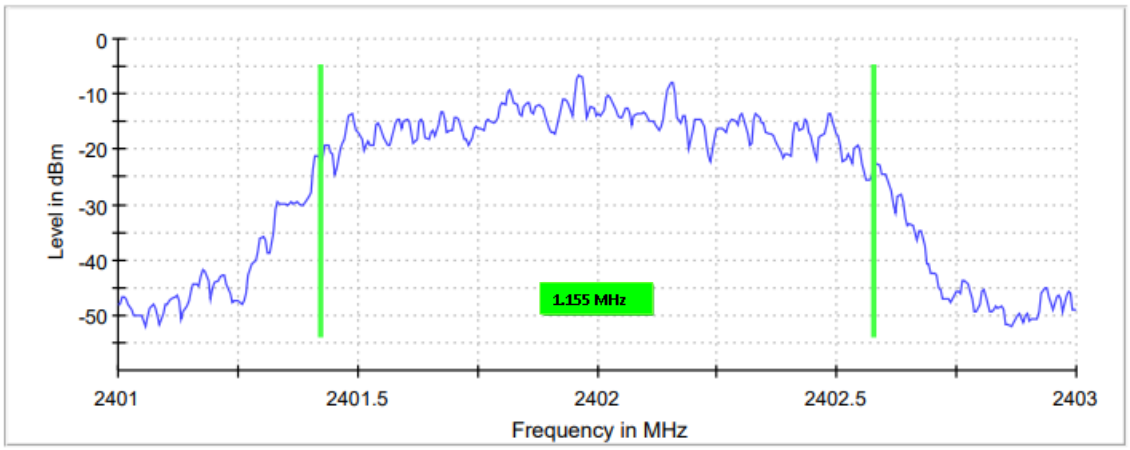


Highest Channel

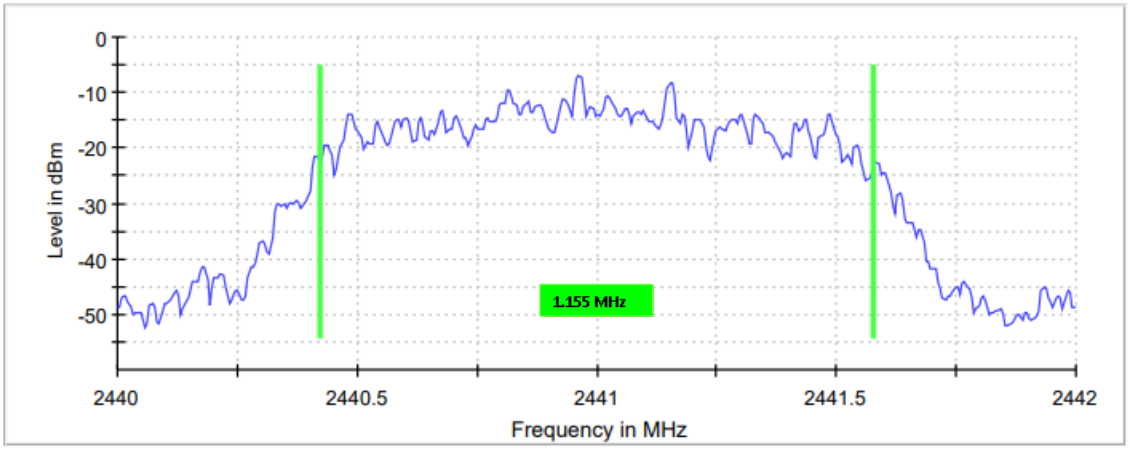


TEST RESULTS (Cont.)	OCCUPIED BANDWIDTH

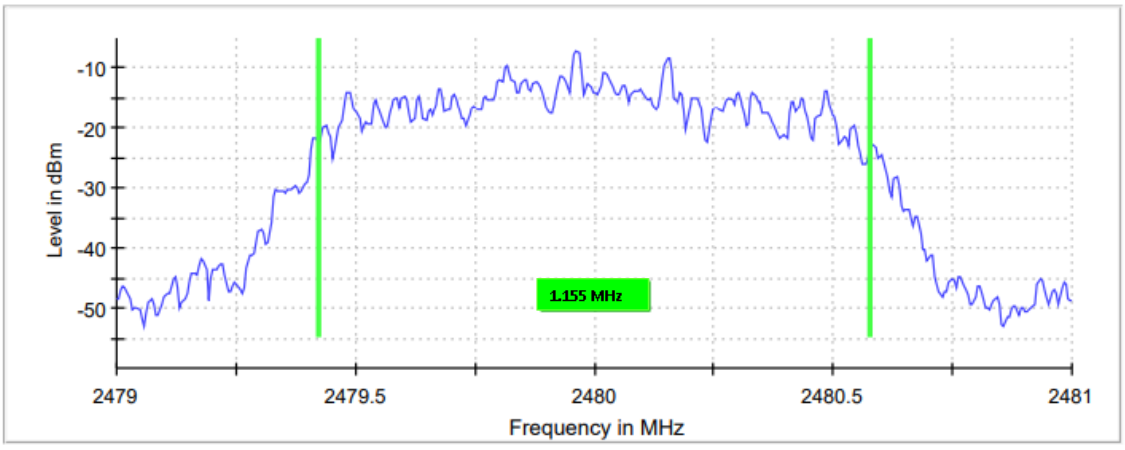
Lowest Channel



Middle Channel



Highest Channel

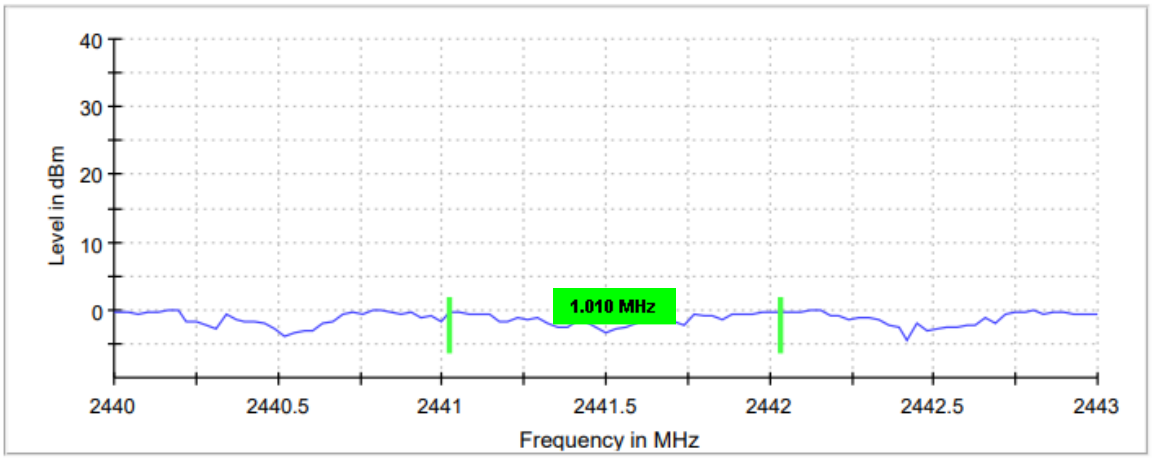


TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

Measurement Set- up

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 µs	189.648 µs	189.648 µs
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	500	500	500
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.30 dB	0.30 dB	0.30 dB
Run	6 / max. 150	6 / max. 150	5 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.09 dB	0.06 dB	0.1 dB

TEST RESULTS (Cont.)	CARRIER FREQUENCY SEPARATION



The hopping channel carrier frequencies are separated by a minimum of the two-thirds of the 20 dB bandwidth of the hopping channel.

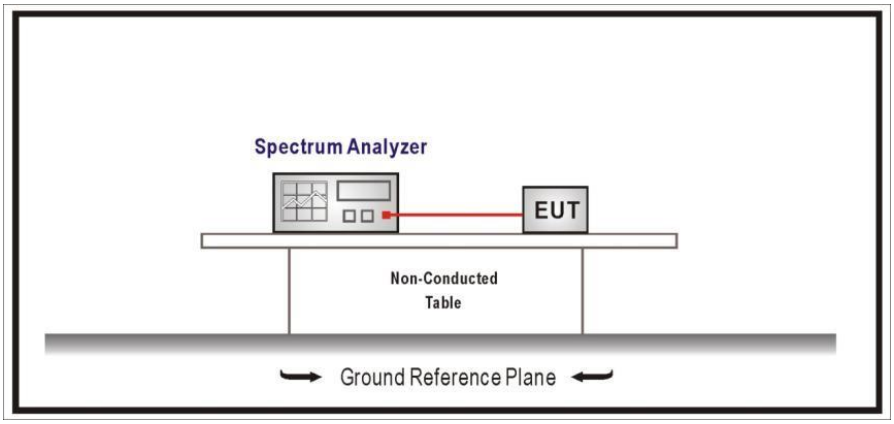
TEST A.2: NUMBER OF HOPPING CHANNELS

LIMITS:	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(a) (1) (iii) and RSS-247 5.1 (d)

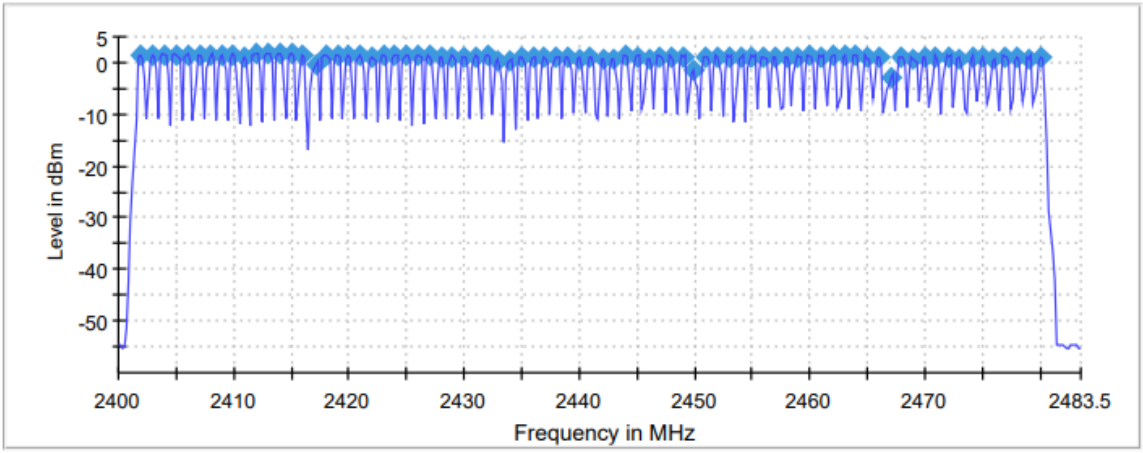
LIMITS

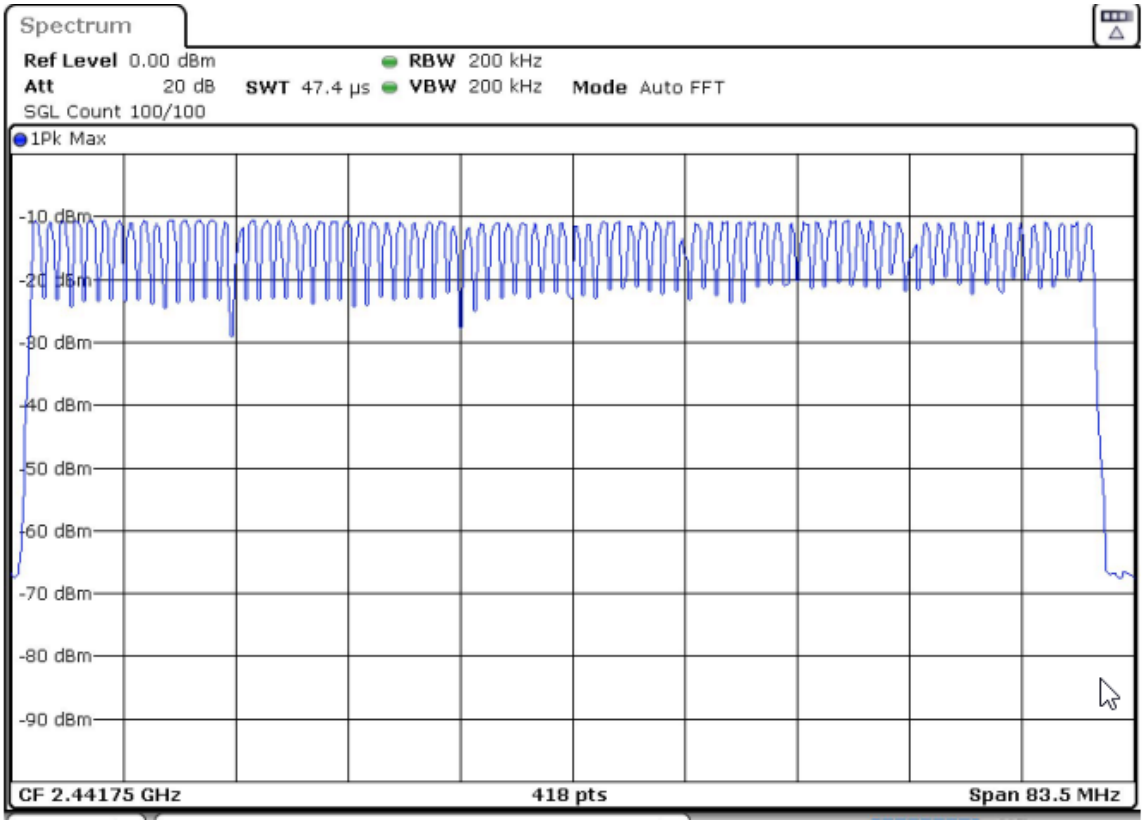
Frequency hopping system in the 2400-2483.5 MHz band shall use at least 15 channels.

TEST SETUP:	



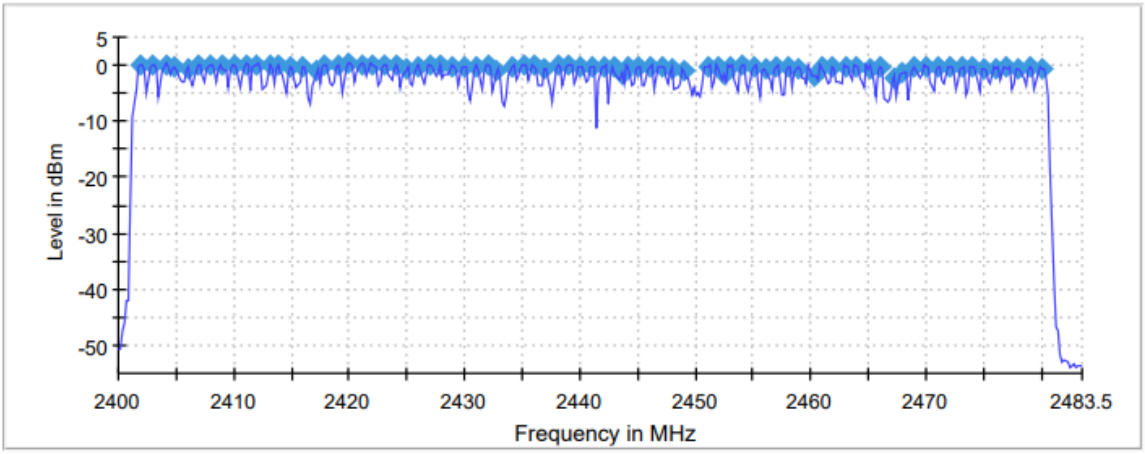
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

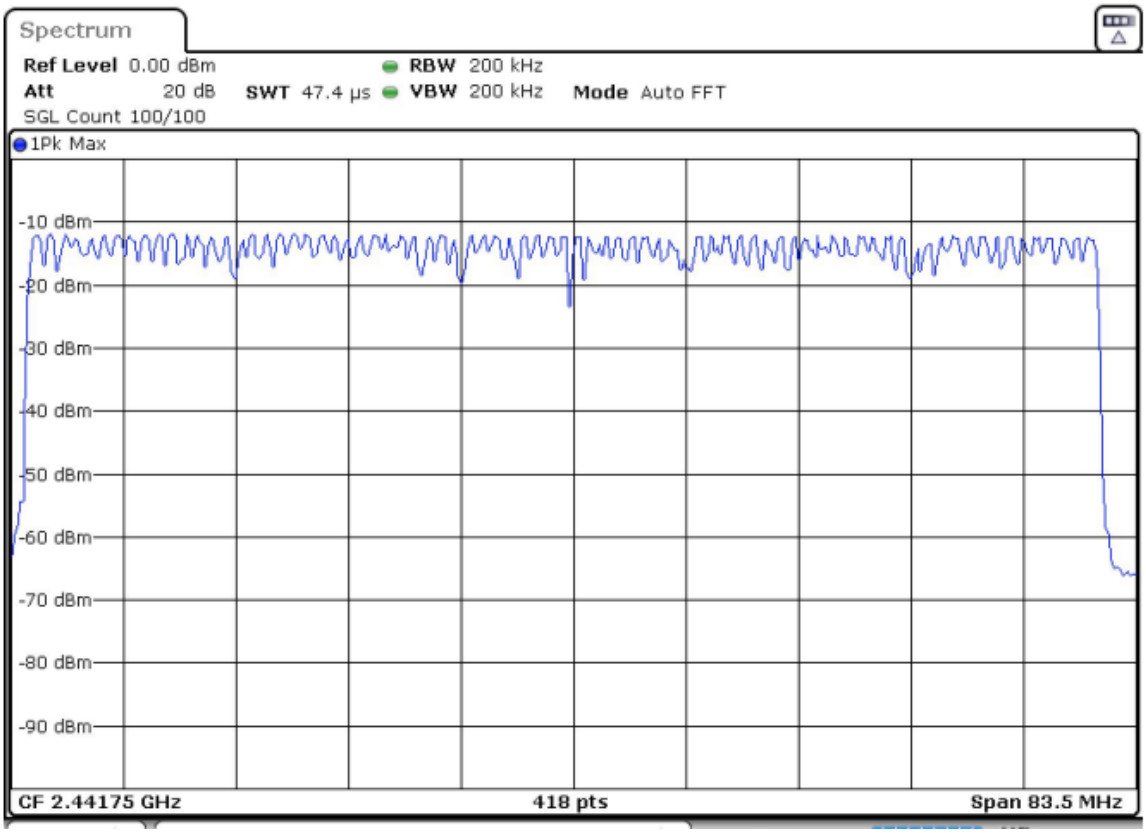




Number of Hopping Frequencies: 79

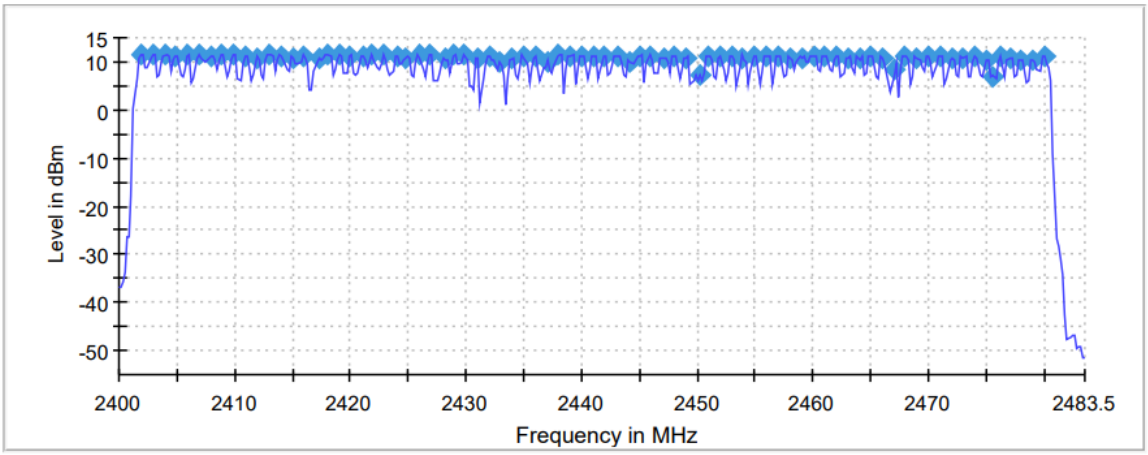
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02
TEST RESULTS:	PASS

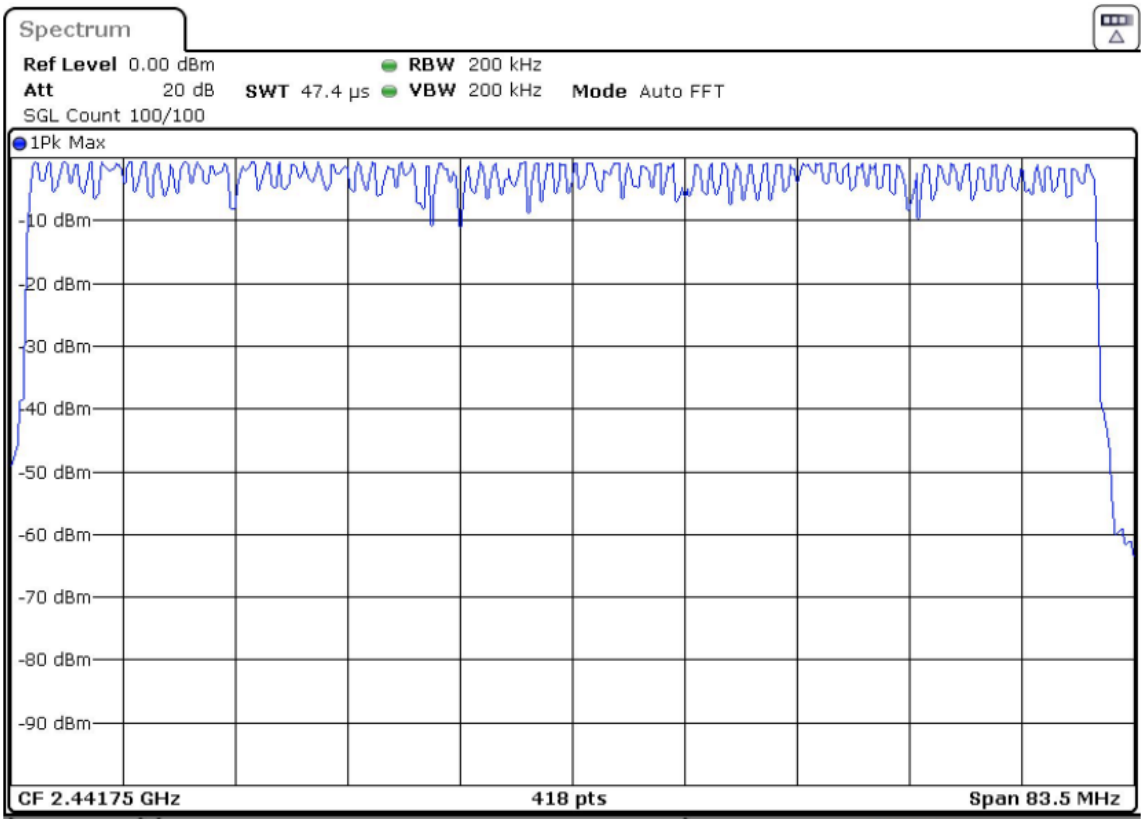




Number of Hopping Frequencies: 80

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03
TEST RESULTS:	PASS





Number of Hopping Frequencies: 80

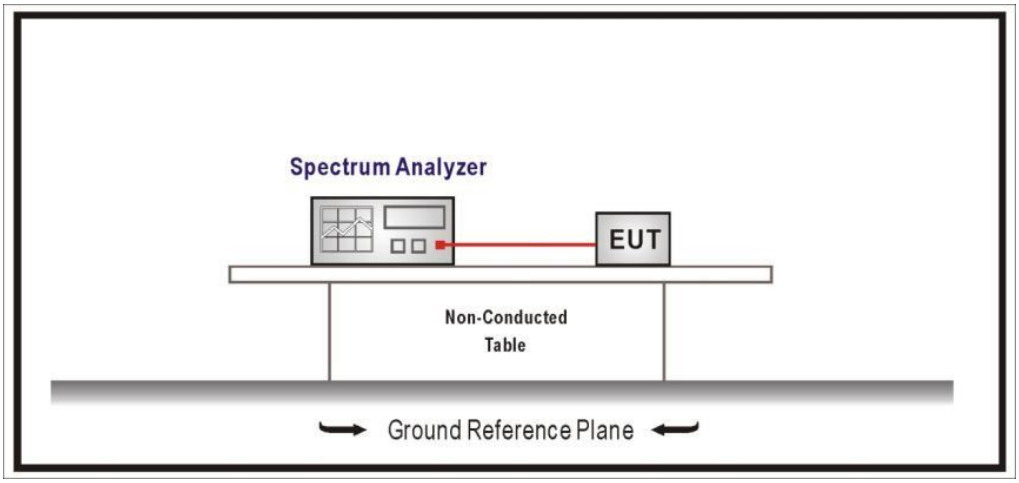
TEST A.3: TIME OF OCCUPANCY (DWELL TIME)

LIMITS:	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(a)(1)(iii) and RSS-247 5.1(d)

LIMITS

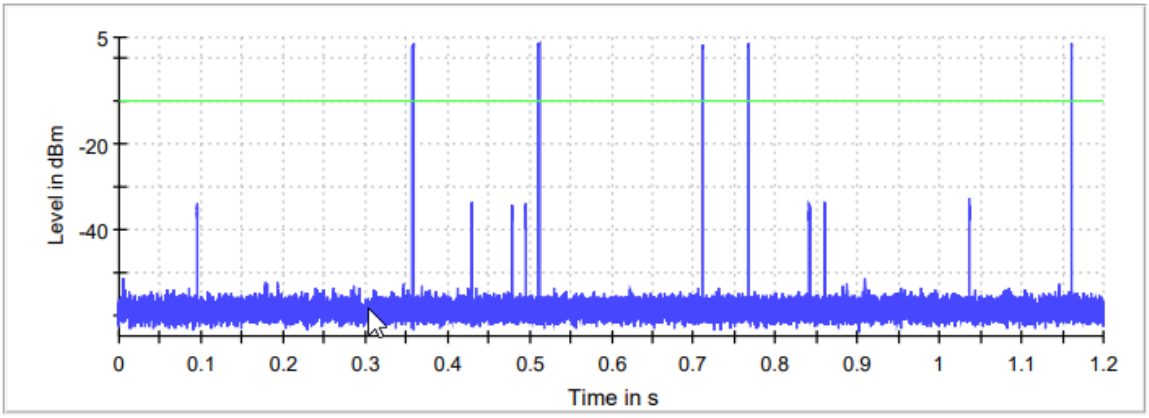
The average time of occupancy on any channel shall not be greater than 0.4 seconds (400 ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed = 0.4 x 79= 31.6 seconds.

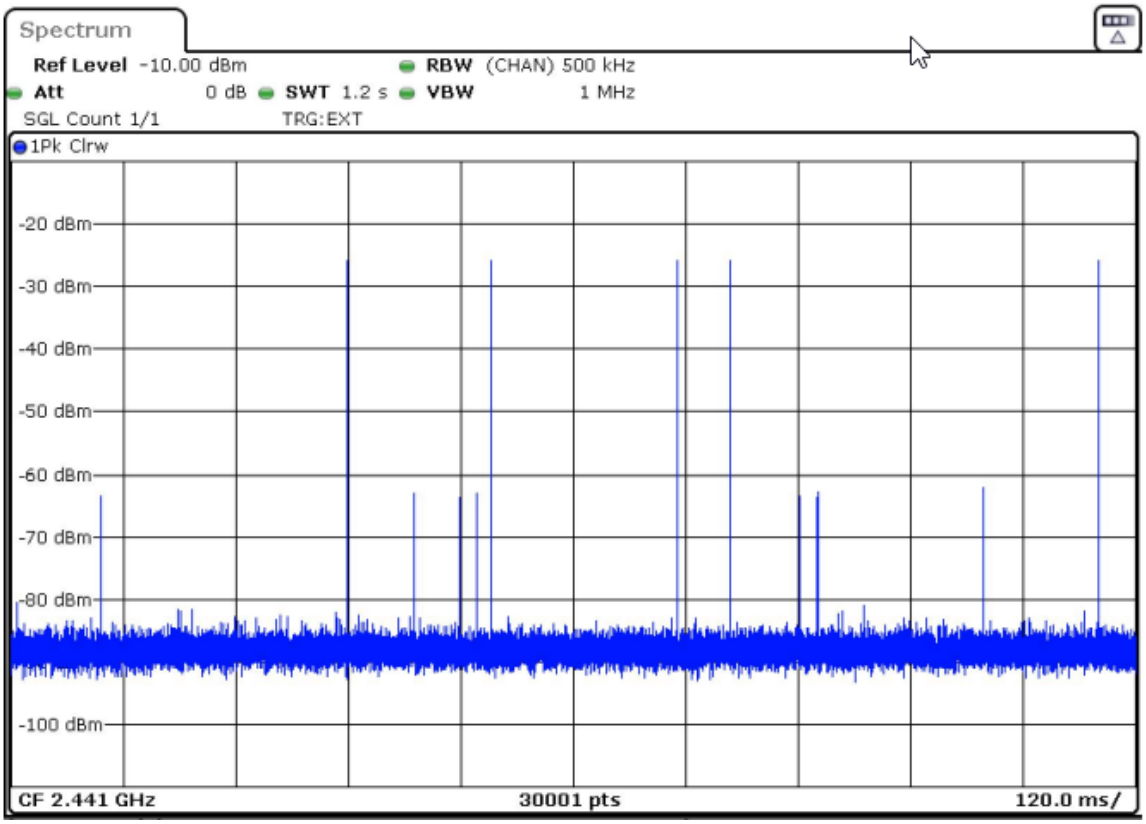
TEST SETUP:	



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01 (GFSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**PACKET TYPE DH5**

Transmit Time per Hop: 0.396 ms



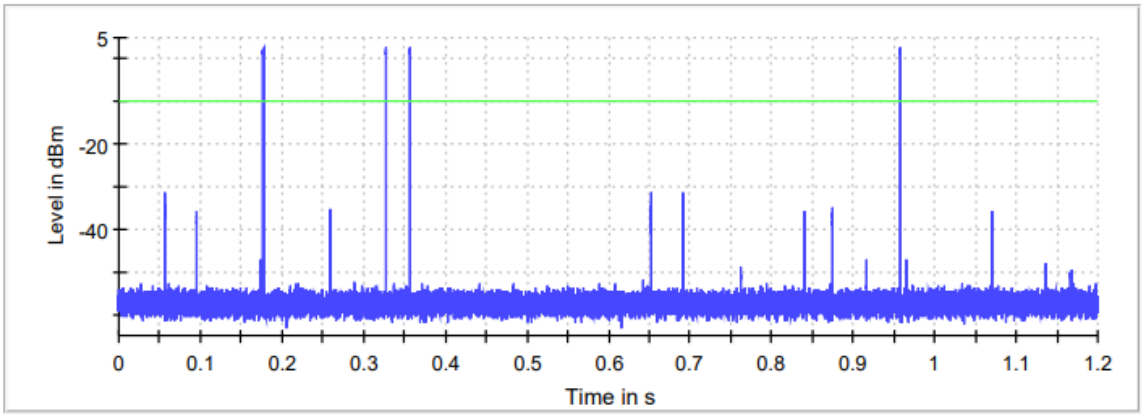


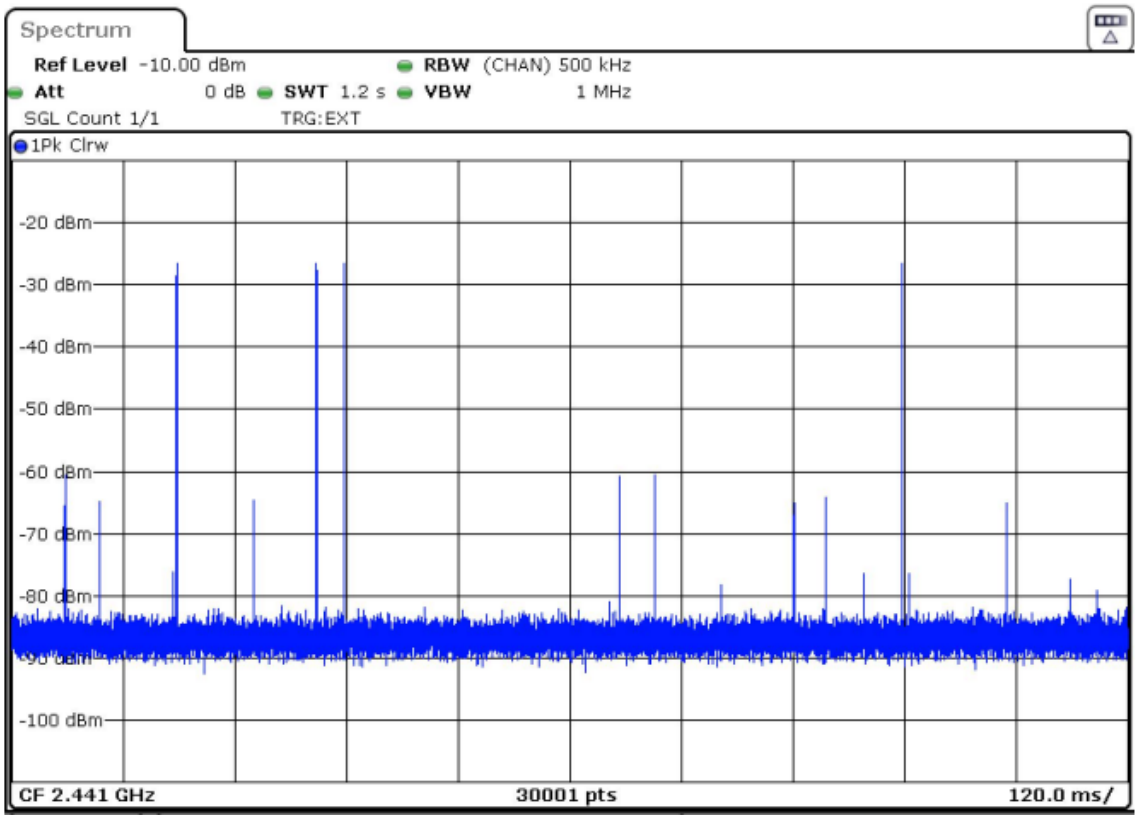
Number of hops over a period of 1.2 seconds: 5 hops.

Number of hops in the period specified in the requirements = (5 hops) x (31.6 s / 1.2 s) = 131 hops.
Averaging time of occupancy = 0.396 ms x 131 hops = 51.876 ms per 31.6 seconds.

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02 (π/4-DQPSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**PACKET TYPE 2DH5**

Transmit Time per Hop: 0.371 ms



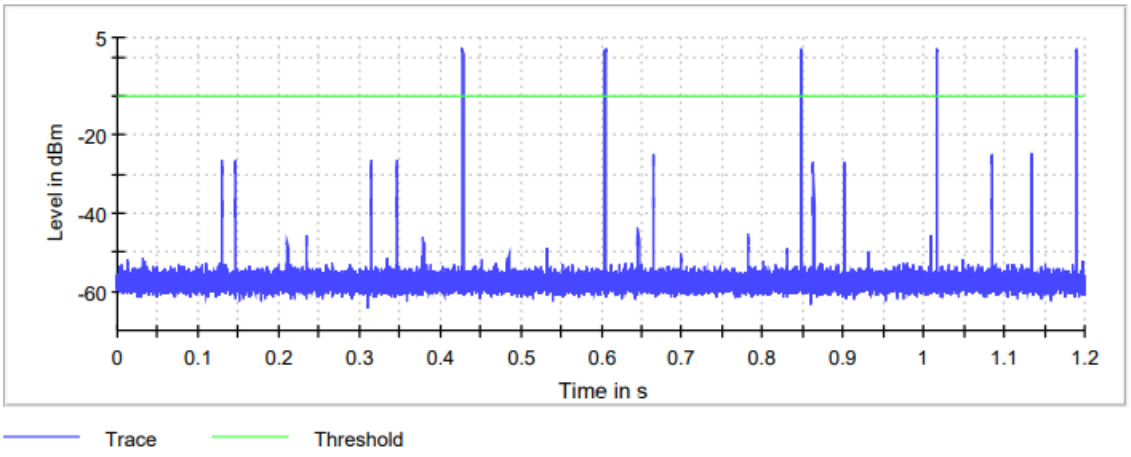


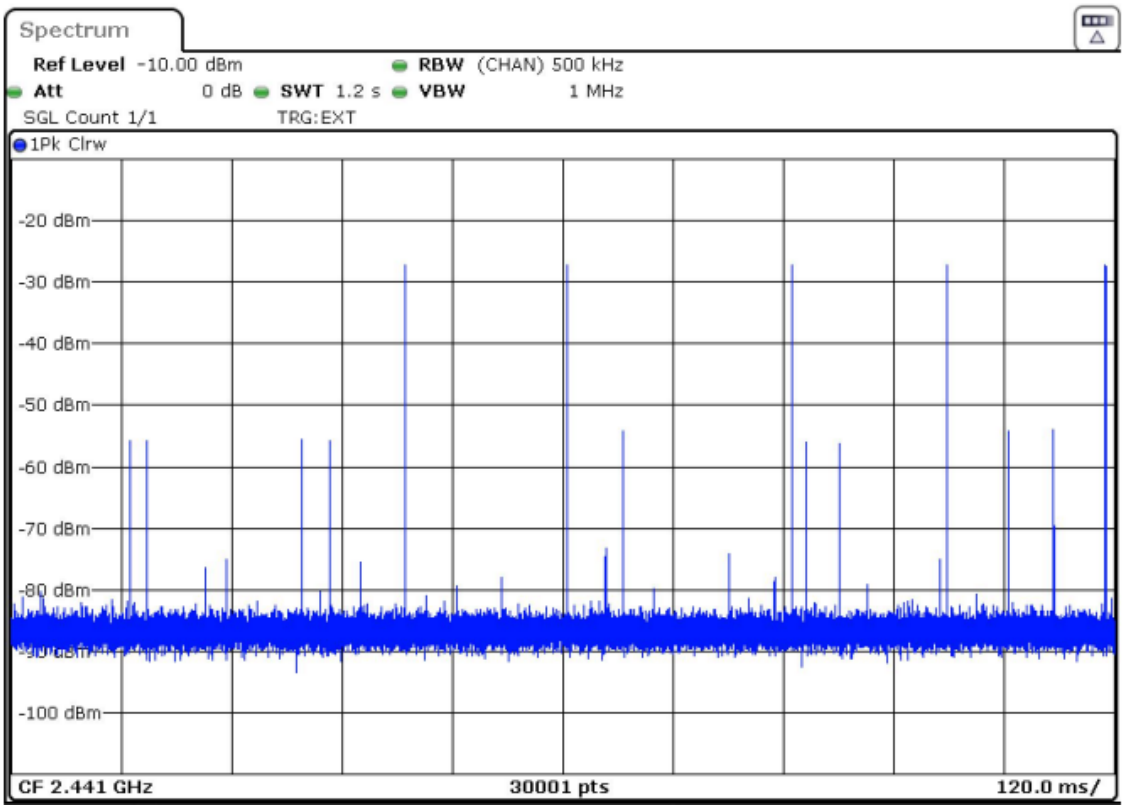
Number of hops over a period of 1.2 seconds: 4 hops.

Number of hops in the period specified in the requirements = (4 hops) x (31.6 s / 1.2 s) = 105 hops.
Averaging time of occupancy = 0.371 ms x 105 hops = 38.955 ms per 31.6 seconds.

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03 (8DPSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**PACKET TYPE 3DH5**

Transmit Time per Hop: 0.381





Number of hops over a period of 1.2 seconds: 5 hops.

Number of hops in the period specified in the requirements = (5 hops) x (31.6 s / 1.2 s) = 132 hops.
Averaging time of occupancy = 0.381 ms x 132 hops = 50.292 ms per 31.6 seconds.

TEST A.4: MAXIMUM PEAK CONDUCTED OUTPUT POWER AND ANTENNA GAIN

LIMITS:	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(b) (3) and RSS-247 5.4(b)

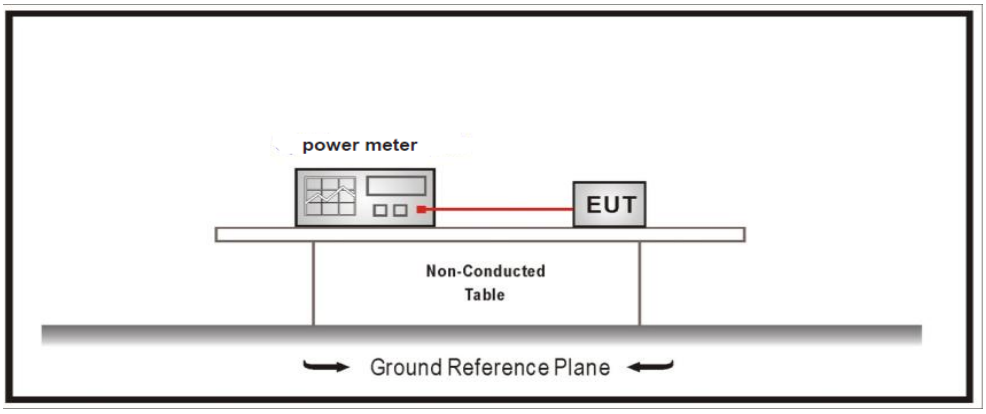
LIMITS

For Frequency Hopping systems operating in the 2400 – 2483.5 MHz band employing at least 75 hopping channels: 1 watt (30 dBm). (Part 15 Subpart C §15.247).

The e.i.r.p. shall not exceed 4 W (RSS-247).

TEST SETUP	

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

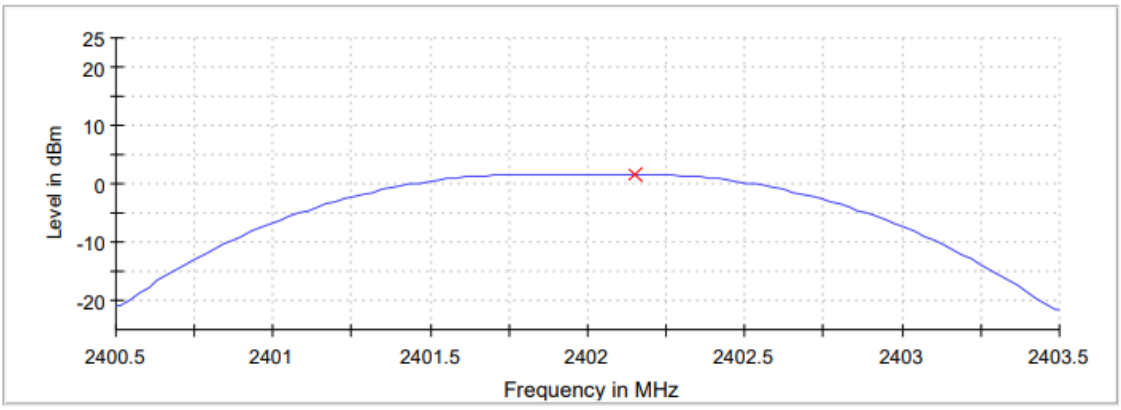
Maximum declared antenna gain: 3.2 dBi

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum conducted power (dBm)	1.6	1.2	1.2
Maximum EIRP power (dBm)	4.8	4.4	4.4

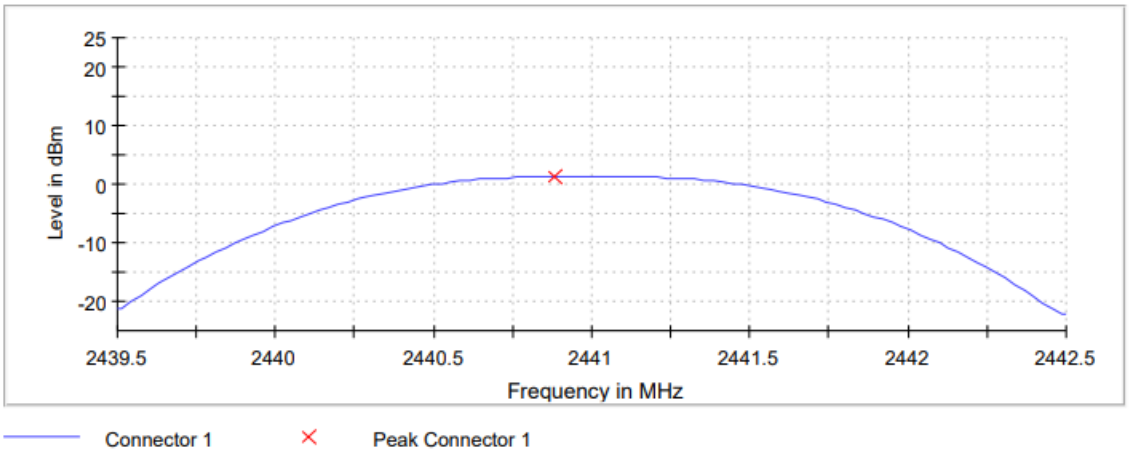
The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

TEST RESULTS (Cont.):	CONDUCTED OUTPUT POWER

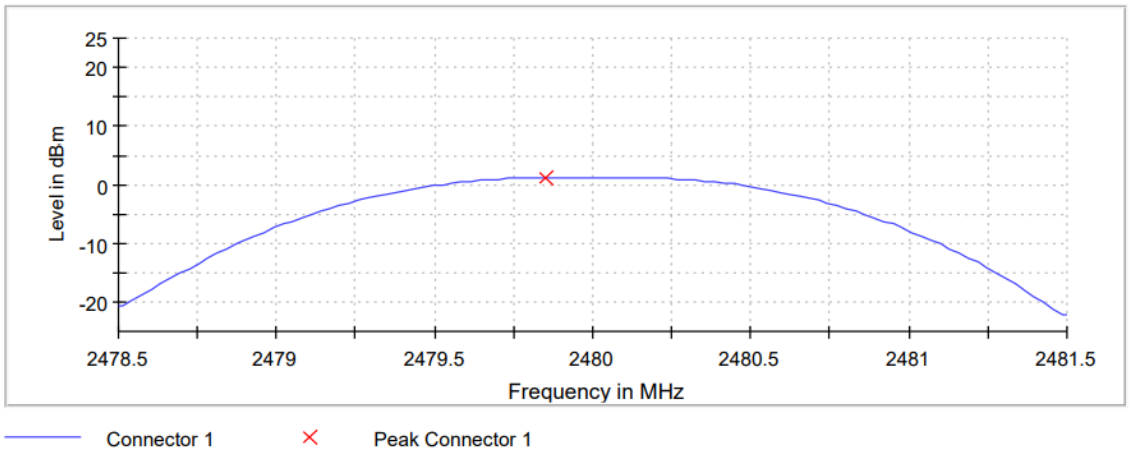
Lowest Channel



Middle Channel



Highest Channel



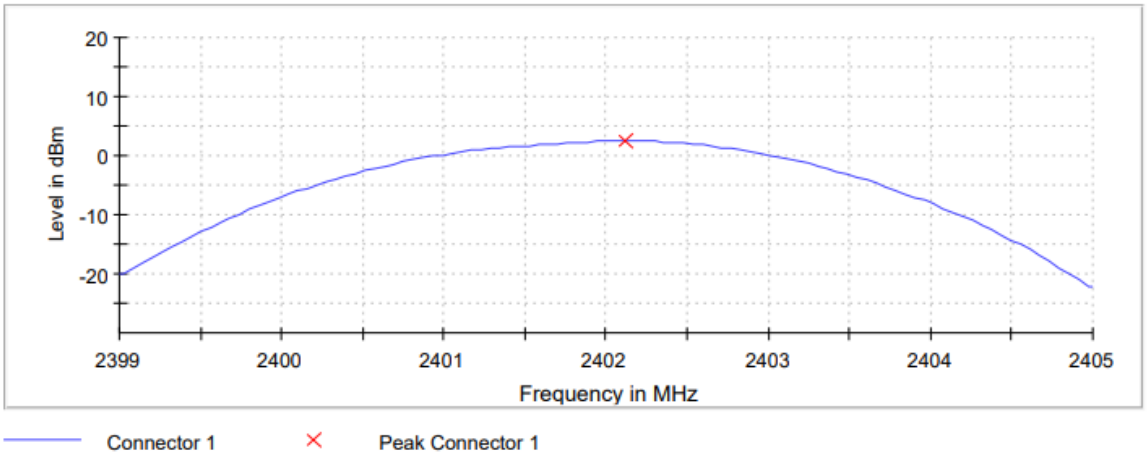
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02
TEST RESULTS:	PASS

Maximum declared antenna gain: 3.2 dBi

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum conducted power (dBm)	2.4	1.9	1.9
Maximum EIRP power (dBm)	5.6	5.1	5.1

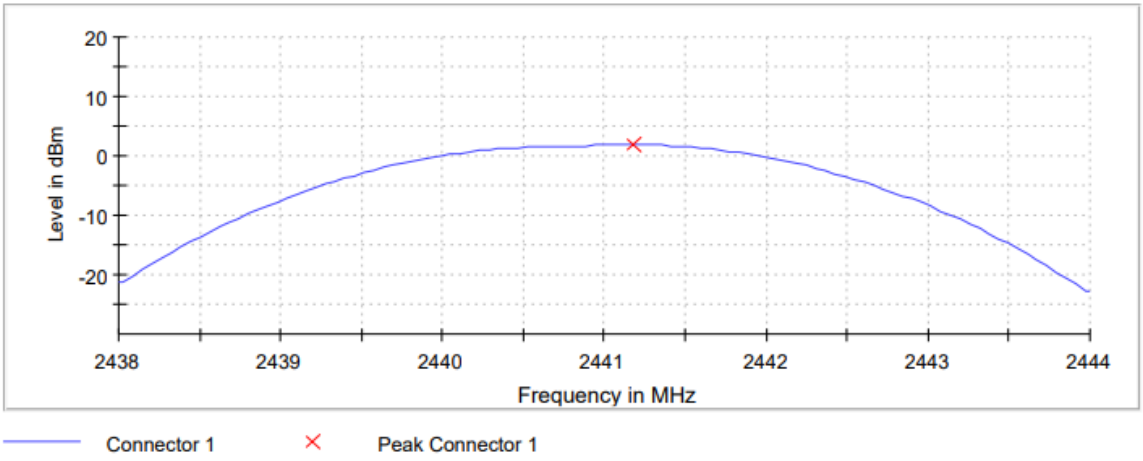
The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

Lowest Channel

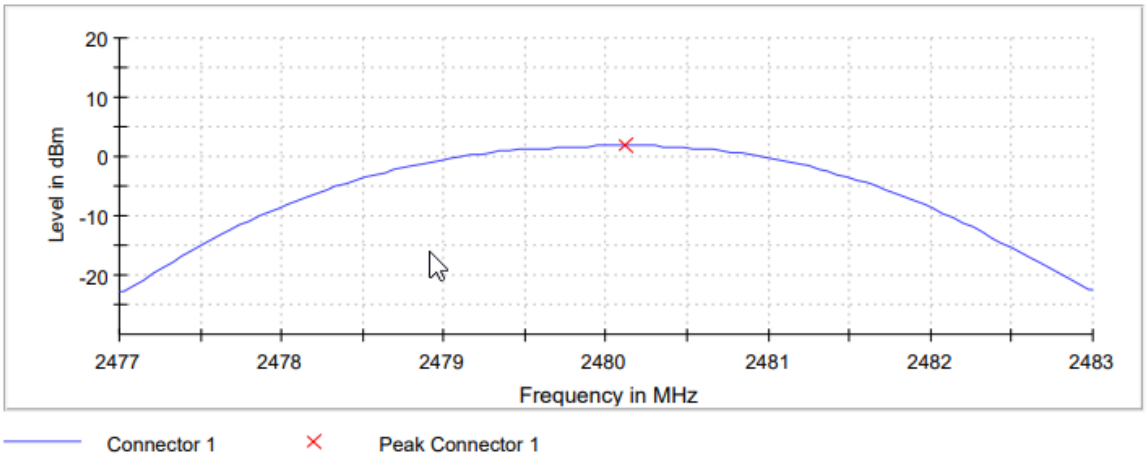


TEST RESULTS (Cont.)	CONDUCTED OUTPUT POWER

Middle Channel



Highest Channel



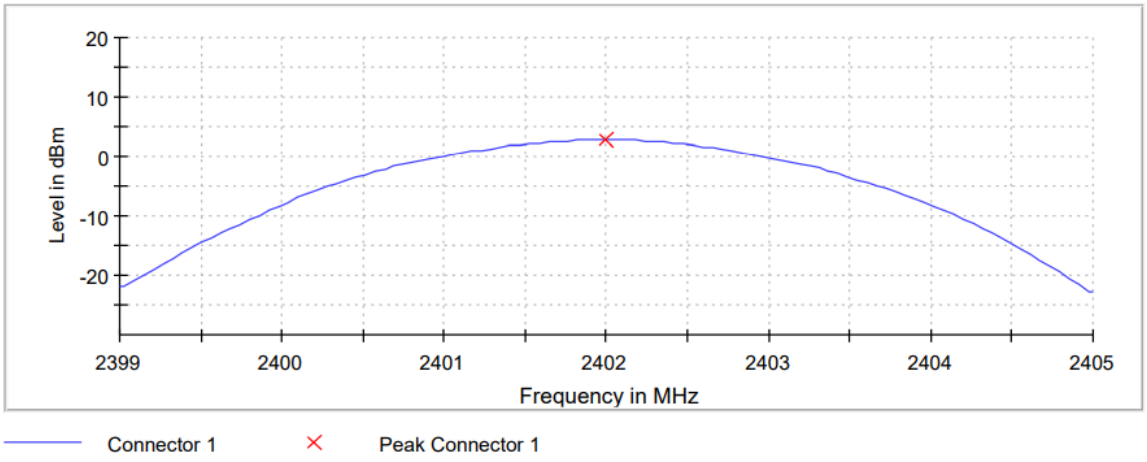
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03
TEST RESULTS:	PASS

Maximum declared antenna gain: 3.2 dBi

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum conducted power (dBm)	2.8	2.1	2.2
Maximum EIRP power (dBm)	6.0	5.3	5.4

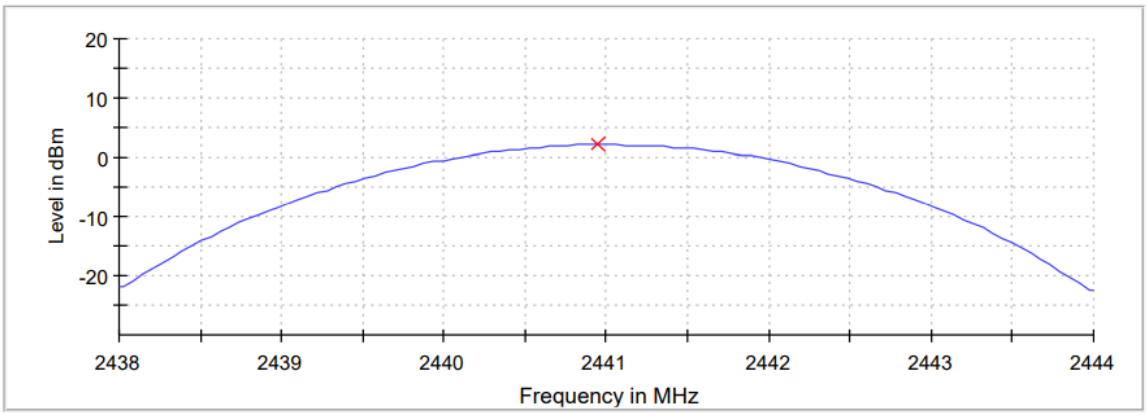
The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

Lowest Channel

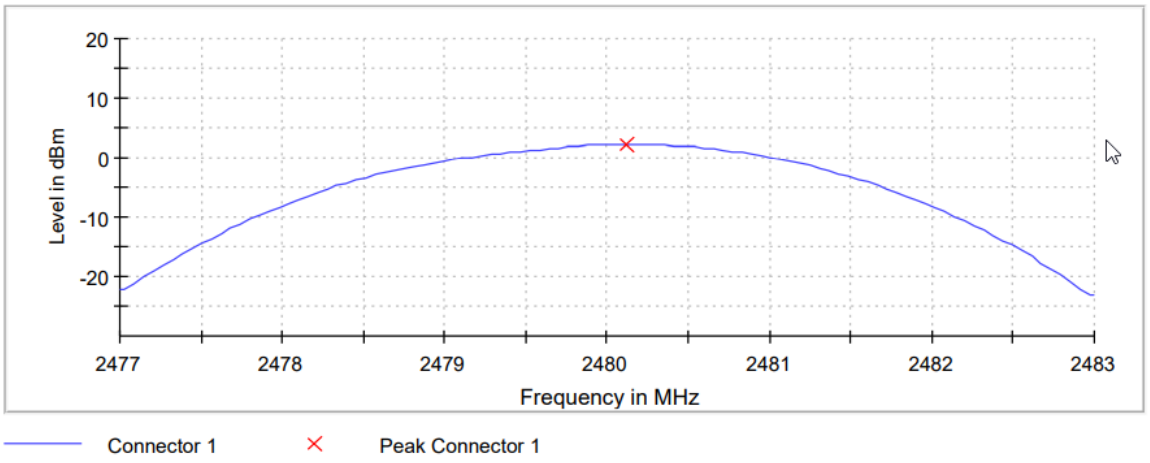


TEST RESULTS (Cont.)	

Middle Channel



Highest Channel



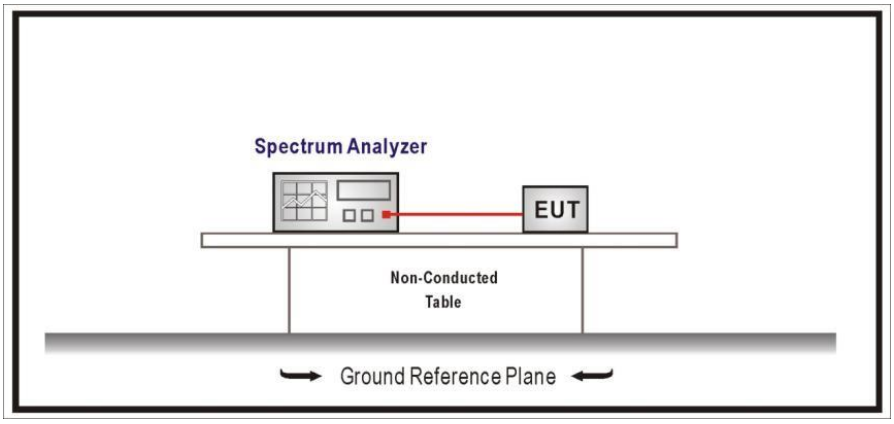
TEST A.5: BAND-EDGE EMISSIONS COMPLIANCE (TRANSMITTER)

LIMITS:	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(d) and RSS-247 5.5

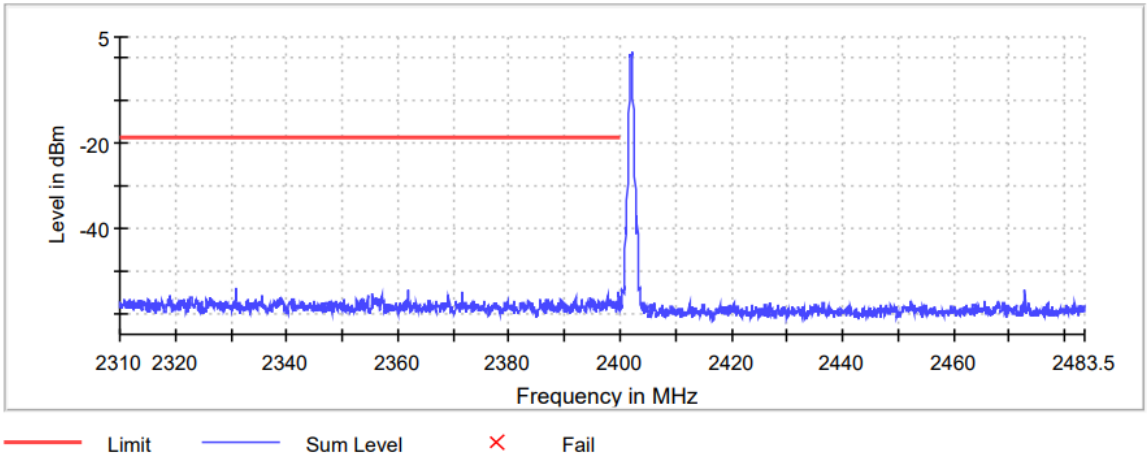
LIMITS

Emissions outside the frequency band in which the intentional radiator is operating shall be at least 20dB below the highest level of the desired power.

TEST SETUP	



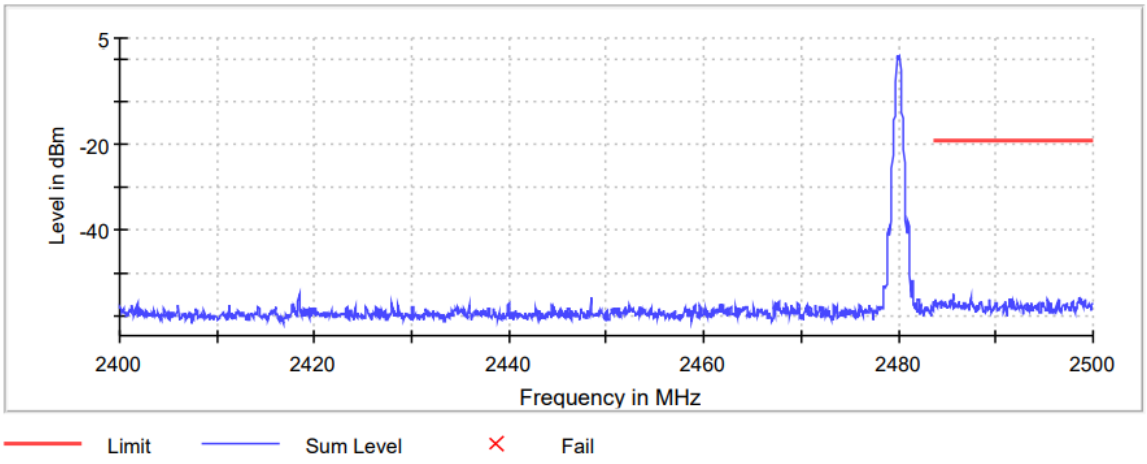
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**HOPPING OFF (Lowest channel)**



Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2330.825000	-53.9	35.4	-18.5	PASS
2330.775000	-54.1	35.6	-18.5	PASS
2361.825000	-54.5	36.0	-18.5	PASS
2361.875000	-54.5	36.0	-18.5	PASS
2371.575000	-54.9	36.5	-18.5	PASS
2330.875000	-55.0	36.5	-18.5	PASS
2399.675000	-55.0	36.6	-18.5	PASS
2371.625000	-55.1	36.6	-18.5	PASS
2399.725000	-55.5	37.0	-18.5	PASS
2355.425000	-55.5	37.0	-18.5	PASS
2397.675000	-55.6	37.2	-18.5	PASS
2368.975000	-55.7	37.2	-18.5	PASS
2355.375000	-55.7	37.3	-18.5	PASS
2397.725000	-55.7	37.3	-18.5	PASS
2369.025000	-55.8	37.3	-18.5	PASS

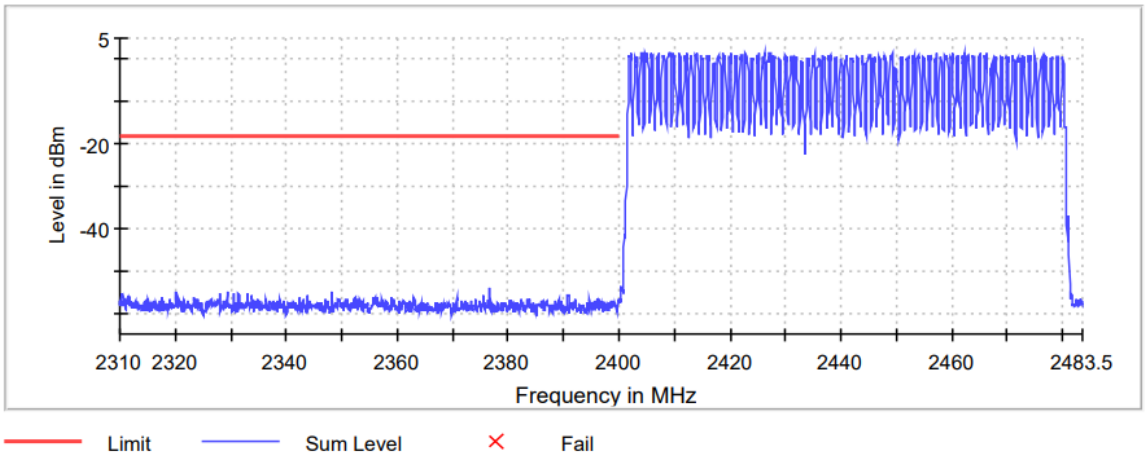
TEST RESULTS (Cont.):	HOPPING OFF (Highest channel)



Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2485.575000	-55.0	36.2	-18.9	PASS
2485.625000	-55.2	36.3	-18.9	PASS
2487.425000	-55.8	37.0	-18.9	PASS
2487.375000	-56.0	37.1	-18.9	PASS
2498.525000	-56.0	37.1	-18.9	PASS
2491.525000	-56.1	37.2	-18.9	PASS
2485.525000	-56.2	37.3	-18.9	PASS
2498.675000	-56.2	37.3	-18.9	PASS
2489.325000	-56.2	37.4	-18.9	PASS
2499.225000	-56.2	37.4	-18.9	PASS
2489.375000	-56.3	37.4	-18.9	PASS
2498.625000	-56.3	37.4	-18.9	PASS
2499.175000	-56.3	37.5	-18.9	PASS
2491.475000	-56.3	37.5	-18.9	PASS
2496.475000	-56.4	37.5	-18.9	PASS

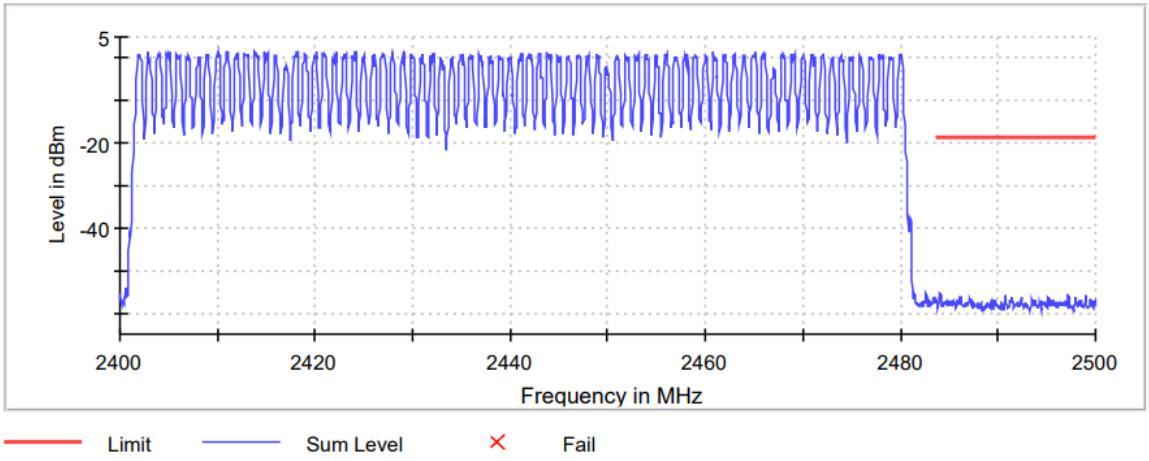
TEST RESULTS (Cont.):	HOPPING ON (Lowest channel)



Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2376.525000	-54.2	35.8	-18.4	PASS
2376.475000	-54.4	36.0	-18.4	PASS
2348.275000	-55.0	36.6	-18.4	PASS
2329.325000	-55.0	36.7	-18.4	PASS
2320.125000	-55.1	36.7	-18.4	PASS
2320.175000	-55.1	36.7	-18.4	PASS
2327.975000	-55.2	36.8	-18.4	PASS
2376.575000	-55.3	37.0	-18.4	PASS
2333.075000	-55.3	37.0	-18.4	PASS
2329.375000	-55.4	37.0	-18.4	PASS
2331.375000	-55.4	37.0	-18.4	PASS
2330.525000	-55.4	37.0	-18.4	PASS
2348.225000	-55.5	37.1	-18.4	PASS
2310.275000	-55.5	37.1	-18.4	PASS
2310.225000	-55.6	37.2	-18.4	PASS

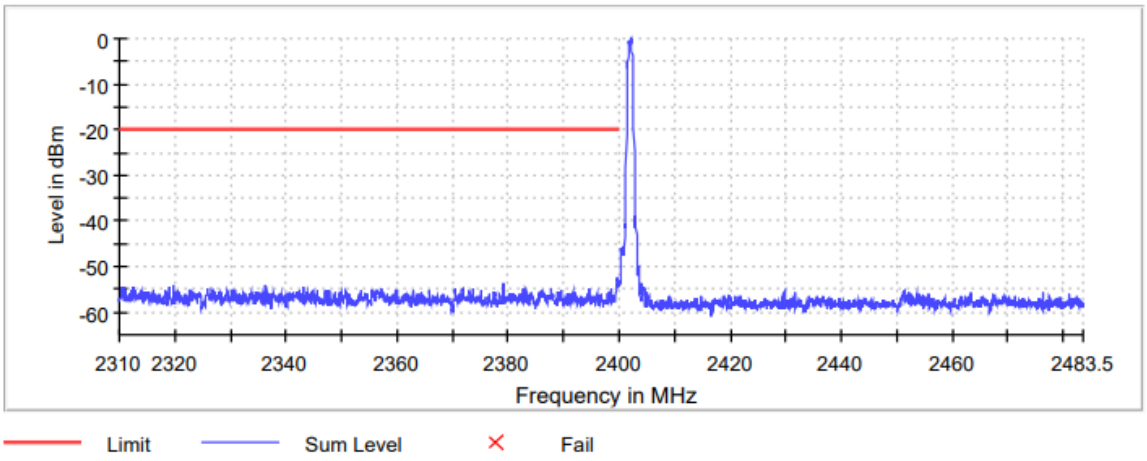
TEST RESULTS (Cont.):	HOPPING ON (Highest channel)



Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2484.075000	-55.4	36.9	-18.5	PASS
2498.925000	-55.8	37.3	-18.5	PASS
2497.225000	-55.9	37.4	-18.5	PASS
2490.725000	-56.0	37.5	-18.5	PASS
2498.975000	-56.0	37.5	-18.5	PASS
2490.775000	-56.0	37.5	-18.5	PASS
2484.125000	-56.0	37.5	-18.5	PASS
2497.275000	-56.1	37.6	-18.5	PASS
2486.225000	-56.2	37.7	-18.5	PASS
2486.125000	-56.3	37.8	-18.5	PASS
2497.925000	-56.3	37.8	-18.5	PASS
2486.175000	-56.3	37.8	-18.5	PASS
2497.975000	-56.4	37.9	-18.5	PASS
2492.375000	-56.4	37.9	-18.5	PASS
2495.125000	-56.5	38.0	-18.5	PASS

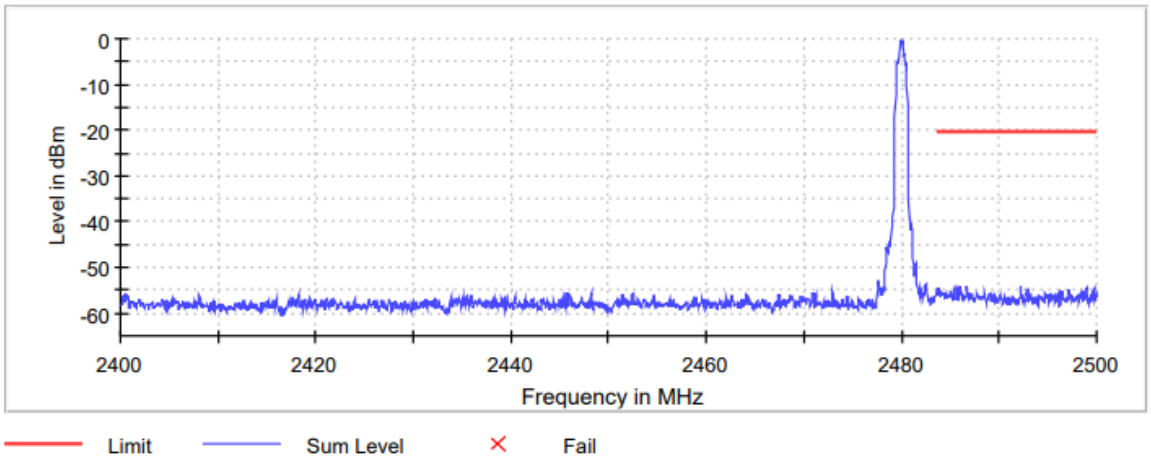
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02 (π/4-DQPSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**HOPPING OFF (Lowest channel)**



Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.725000	-52.5	32.5	-20.0	PASS
2399.675000	-52.9	32.8	-20.0	PASS
2399.775000	-53.1	33.1	-20.0	PASS
2399.875000	-53.4	33.4	-20.0	PASS
2379.175000	-53.7	33.7	-20.0	PASS
2399.525000	-53.7	33.7	-20.0	PASS
2399.825000	-53.8	33.8	-20.0	PASS
2379.125000	-53.9	33.8	-20.0	PASS
2319.775000	-54.0	34.0	-20.0	PASS
2336.275000	-54.1	34.1	-20.0	PASS
2399.575000	-54.2	34.2	-20.0	PASS
2319.825000	-54.3	34.2	-20.0	PASS
2318.925000	-54.3	34.2	-20.0	PASS
2312.475000	-54.3	34.3	-20.0	PASS
2399.925000	-54.3	34.3	-20.0	PASS

TEST RESULTS (Cont.):	HOPPING OFF (Highest channel)

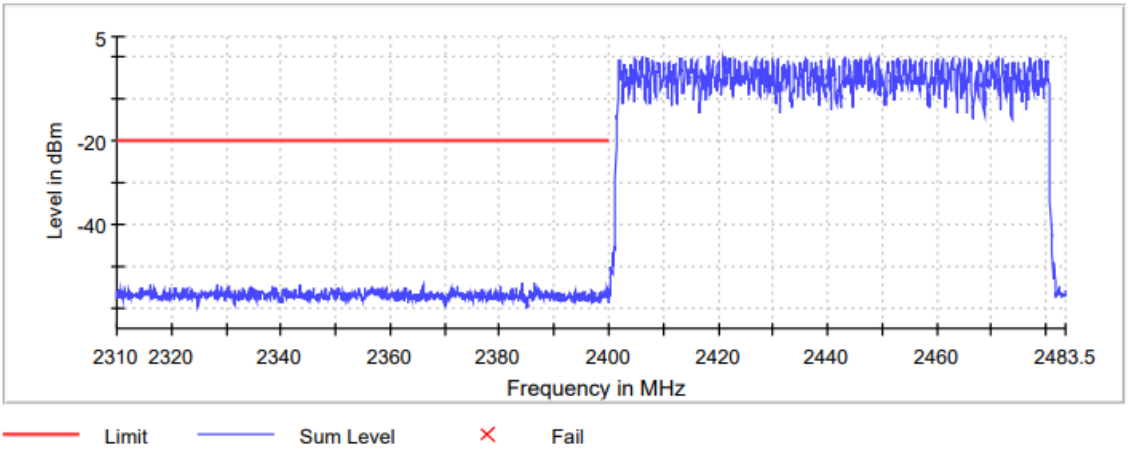


Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2486.675000	-54.0	33.7	-20.3	PASS
2492.225000	-54.1	33.7	-20.3	PASS
2486.075000	-54.2	33.8	-20.3	PASS
2492.175000	-54.2	33.9	-20.3	PASS
2499.725000	-54.2	33.9	-20.3	PASS
2485.725000	-54.4	34.0	-20.3	PASS
2483.775000	-54.4	34.1	-20.3	PASS
2486.625000	-54.5	34.2	-20.3	PASS
2498.875000	-54.5	34.2	-20.3	PASS
2486.125000	-54.5	34.2	-20.3	PASS
2485.925000	-54.6	34.3	-20.3	PASS
2485.775000	-54.7	34.3	-20.3	PASS
2492.925000	-54.7	34.3	-20.3	PASS
2483.725000	-54.7	34.3	-20.3	PASS
2486.725000	-54.7	34.4	-20.3	PASS

TEST RESULTS (Cont.):	HOPPING ON (Lowest channel)

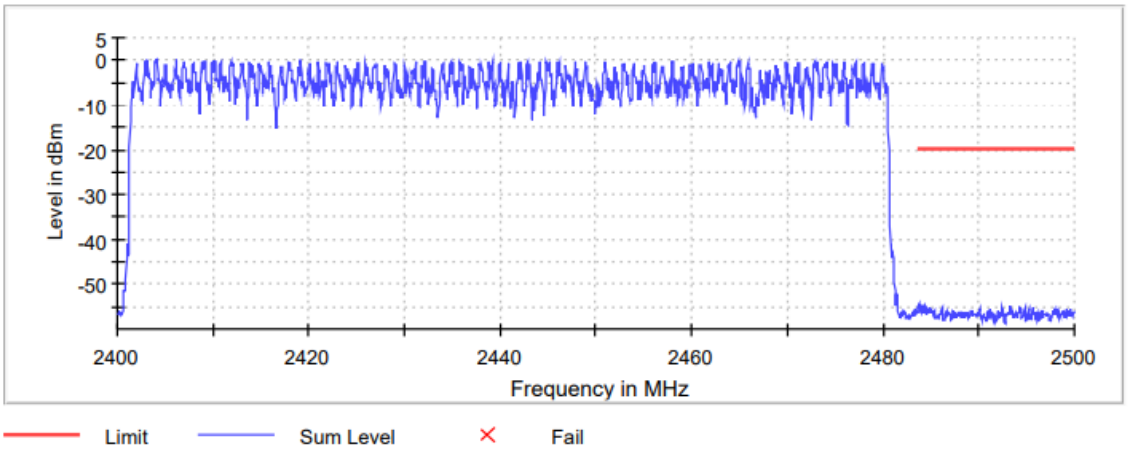
Low**est Channel**



Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2384.125000	-54.0	34.1	-19.9	PASS
2384.175000	-54.1	34.1	-19.9	PASS
2386.425000	-54.2	34.3	-19.9	PASS
2386.475000	-54.3	34.4	-19.9	PASS
2343.475000	-54.4	34.5	-19.9	PASS
2328.325000	-54.4	34.5	-19.9	PASS
2328.375000	-54.5	34.5	-19.9	PASS
2365.975000	-54.5	34.6	-19.9	PASS
2316.075000	-54.7	34.8	-19.9	PASS
2338.525000	-54.7	34.8	-19.9	PASS
2338.475000	-54.8	34.9	-19.9	PASS
2343.525000	-54.9	35.0	-19.9	PASS
2329.125000	-55.0	35.1	-19.9	PASS
2384.075000	-55.0	35.1	-19.9	PASS
2366.025000	-55.1	35.1	-19.9	PASS

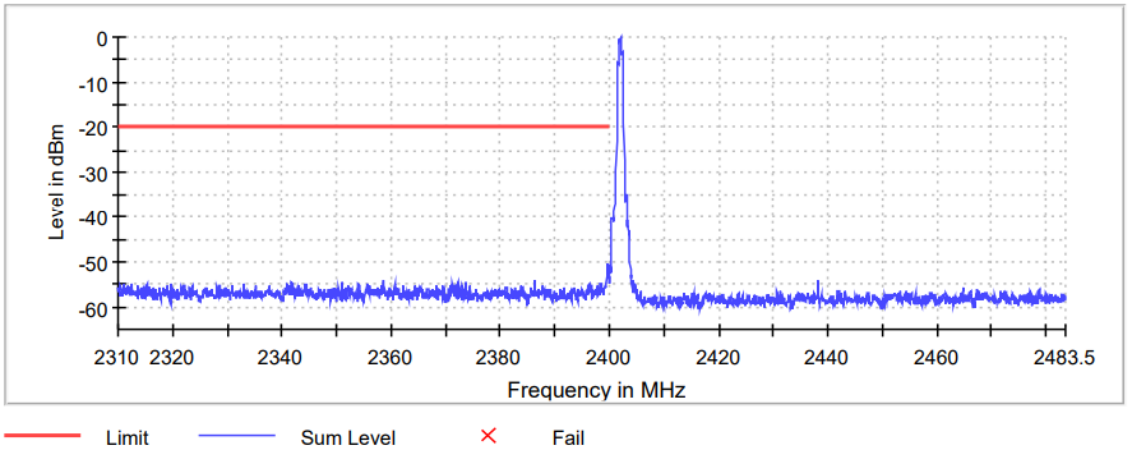
TEST RESULTS (Cont.):	HOPPING ON (Highest channel)



Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2483.725000	-54.4	34.5	-19.9	PASS
2484.125000	-54.5	34.6	-19.9	PASS
2484.075000	-54.6	34.7	-19.9	PASS
2493.225000	-54.6	34.7	-19.9	PASS
2484.475000	-54.8	34.9	-19.9	PASS
2493.275000	-54.9	34.9	-19.9	PASS
2484.025000	-54.9	34.9	-19.9	PASS
2483.975000	-55.0	35.0	-19.9	PASS
2495.625000	-55.0	35.0	-19.9	PASS
2495.675000	-55.0	35.1	-19.9	PASS
2494.325000	-55.0	35.1	-19.9	PASS
2492.475000	-55.1	35.2	-19.9	PASS
2486.175000	-55.2	35.2	-19.9	PASS
2492.425000	-55.2	35.3	-19.9	PASS
2483.675000	-55.2	35.3	-19.9	PASS

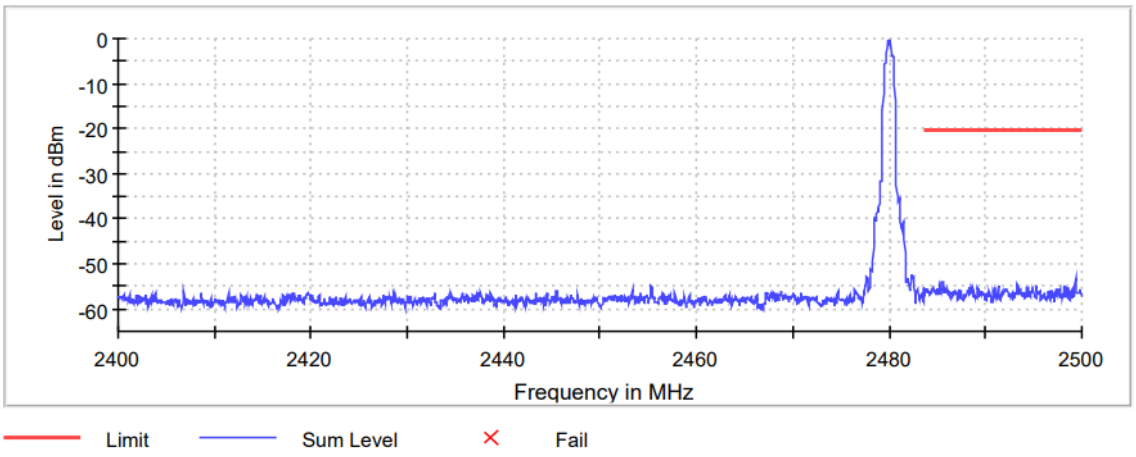
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03 (8DPSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**HOPPING OFF (Lowest channel)**



Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.575000	-50.2	30.1	-20.1	PASS
2399.525000	-50.5	30.4	-20.1	PASS
2399.625000	-50.7	30.6	-20.1	PASS
2399.675000	-51.5	31.4	-20.1	PASS
2399.725000	-51.8	31.7	-20.1	PASS
2399.775000	-52.5	32.4	-20.1	PASS
2399.475000	-52.8	32.7	-20.1	PASS
2399.875000	-53.1	33.1	-20.1	PASS
2399.925000	-53.3	33.2	-20.1	PASS
2399.825000	-53.5	33.4	-20.1	PASS
2386.275000	-54.2	34.1	-20.1	PASS
2358.675000	-54.2	34.1	-20.1	PASS
2358.625000	-54.3	34.2	-20.1	PASS
2372.125000	-54.4	34.3	-20.1	PASS
2350.925000	-54.4	34.3	-20.1	PASS

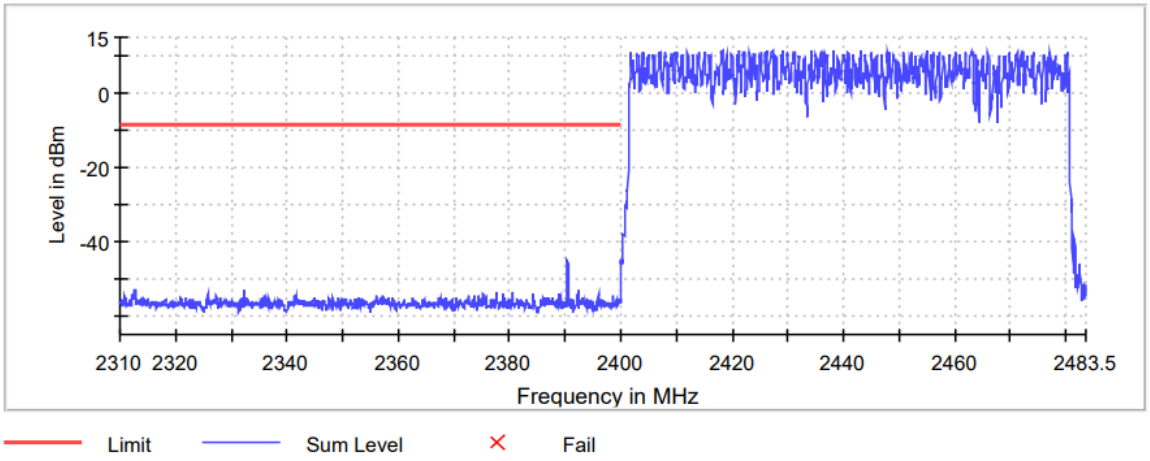
TEST RESULTS (Cont.):	HOPPING OFF (Highest channel)



Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2499.375000	-53.3	33.0	-20.3	PASS
2499.325000	-53.4	33.1	-20.3	PASS
2485.525000	-53.9	33.7	-20.3	PASS
2485.475000	-53.9	33.7	-20.3	PASS
2493.325000	-54.6	34.4	-20.3	PASS
2499.425000	-54.8	34.5	-20.3	PASS
2495.275000	-54.8	34.5	-20.3	PASS
2491.275000	-54.9	34.6	-20.3	PASS
2498.125000	-54.9	34.6	-20.3	PASS
2485.275000	-54.9	34.7	-20.3	PASS
2491.325000	-55.0	34.7	-20.3	PASS
2493.375000	-55.1	34.8	-20.3	PASS
2498.425000	-55.2	34.9	-20.3	PASS
2495.325000	-55.2	34.9	-20.3	PASS
2498.175000	-55.2	34.9	-20.3	PASS

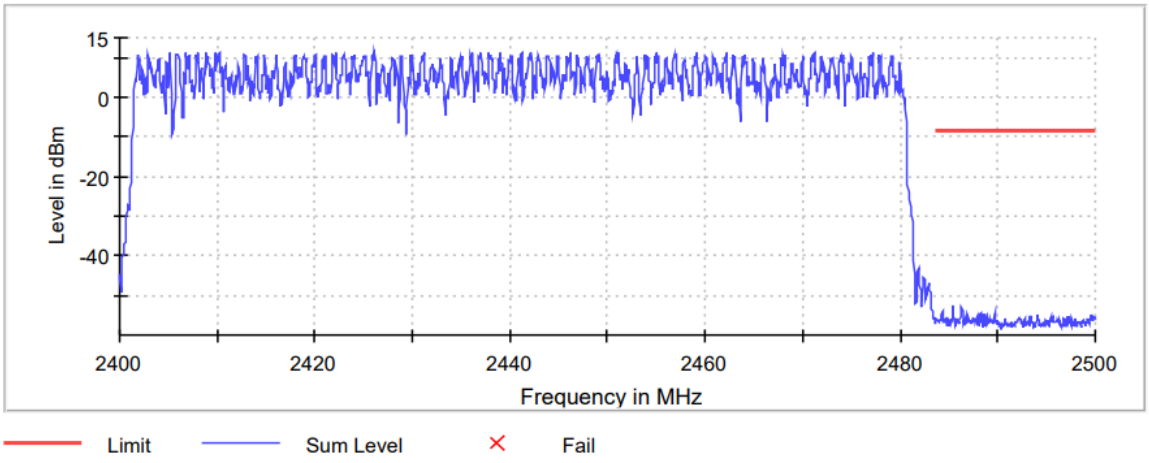
TEST RESULTS (Cont.):	HOPPING ON (Lowest channel)



Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2390.425000	-45.2	36.7	-8.5	PASS
2390.375000	-45.8	37.3	-8.5	PASS
2390.475000	-45.9	37.5	-8.5	PASS
2390.525000	-49.9	41.4	-8.5	PASS
2390.325000	-50.1	41.6	-8.5	PASS
2312.675000	-52.8	44.3	-8.5	PASS
2312.725000	-52.8	44.3	-8.5	PASS
2392.325000	-53.1	44.7	-8.5	PASS
2332.275000	-53.2	44.7	-8.5	PASS
2392.375000	-53.2	44.8	-8.5	PASS
2377.625000	-53.4	44.9	-8.5	PASS
2380.575000	-53.4	44.9	-8.5	PASS
2380.525000	-53.4	45.0	-8.5	PASS
2332.225000	-53.6	45.2	-8.5	PASS
2377.675000	-53.7	45.3	-8.5	PASS

TEST RESULTS (Cont.):	HOPPING ON (Highest channel)



Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2485.425000	-52.7	44.1	-8.6	PASS
2486.325000	-52.7	44.2	-8.6	PASS
2485.375000	-52.8	44.2	-8.6	PASS
2486.275000	-52.9	44.3	-8.6	PASS
2484.375000	-53.8	45.2	-8.6	PASS
2484.325000	-54.0	45.5	-8.6	PASS
2486.375000	-54.1	45.5	-8.6	PASS
2489.725000	-54.3	45.7	-8.6	PASS
2489.675000	-54.3	45.7	-8.6	PASS
2488.225000	-54.6	46.0	-8.6	PASS
2485.475000	-54.6	46.0	-8.6	PASS
2486.925000	-54.7	46.1	-8.6	PASS
2484.275000	-54.7	46.1	-8.6	PASS
2484.225000	-54.7	46.1	-8.6	PASS
2486.875000	-54.8	46.2	-8.6	PASS

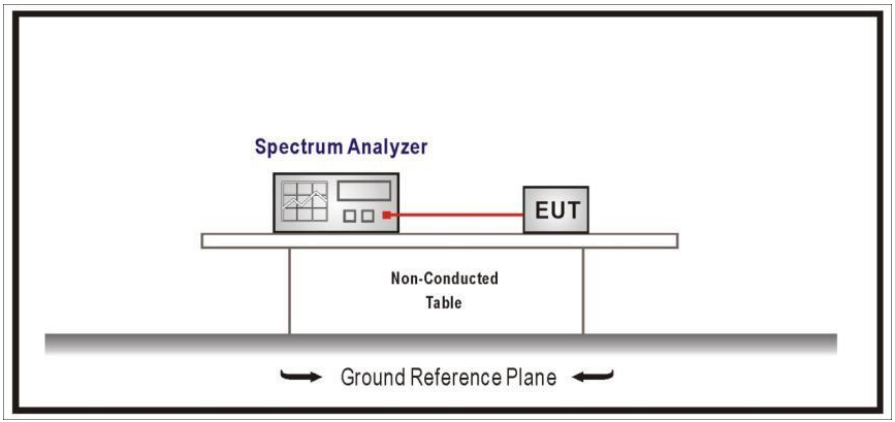
TEST A.6: EMISSION LIMITATIONS CONDUCTED (TRANSMITTER)

LIMITS:	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(d) and RSS-Gen 8.9 and 8.10

SPECIFICATION

In any 100 kHz bandwidth outside the frequency band in which the digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB instead of 20 dB.

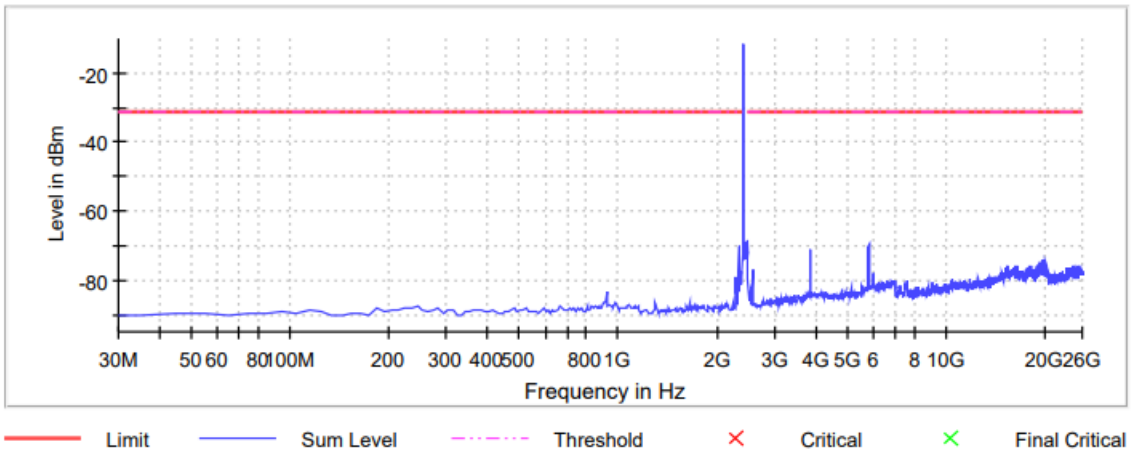
TEST SETUP	



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

Frequency range 30 MHz – 26 GHz

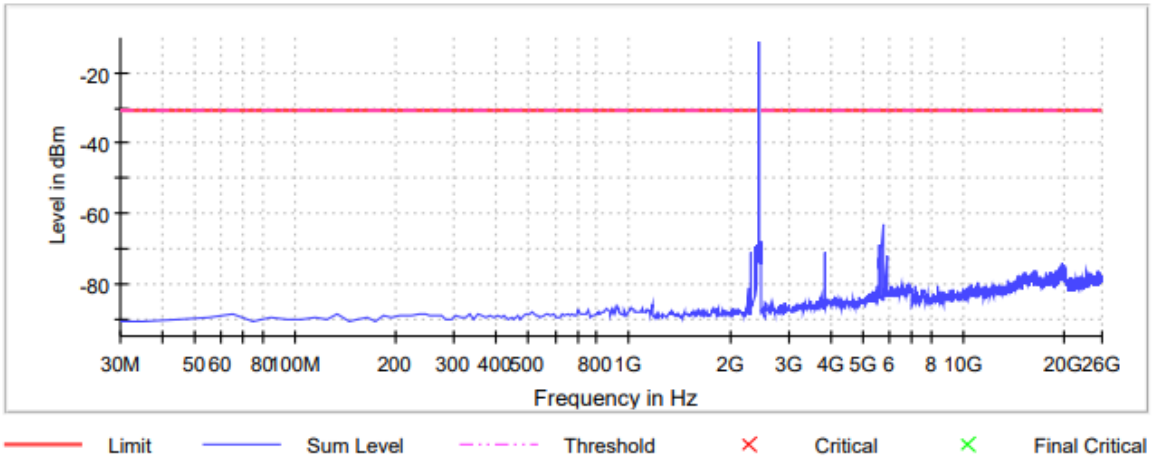
Low Channel:



Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
5796.598066	-69.5	38.2	-31.4
2335.273109	-69.8	38.4	-31.4
5786.603804	-70.8	39.4	-31.4
2395.021008	-71.0	39.6	-31.4
3847.716851	-71.2	39.8	-31.4
5776.609541	-72.7	41.3	-31.4
20128.370697	-74.2	42.8	-31.4
19798.560030	-74.4	43.0	-31.4
19838.537080	-74.5	43.1	-31.4
19808.554292	-74.5	43.1	-31.4
20108.382172	-74.6	43.2	-31.4
20118.376434	-74.6	43.2	-31.4
19758.582979	-74.7	43.3	-31.4
20088.393646	-74.8	43.4	-31.4
19368.806736	-74.9	43.5	-31.4

Mid Channel:

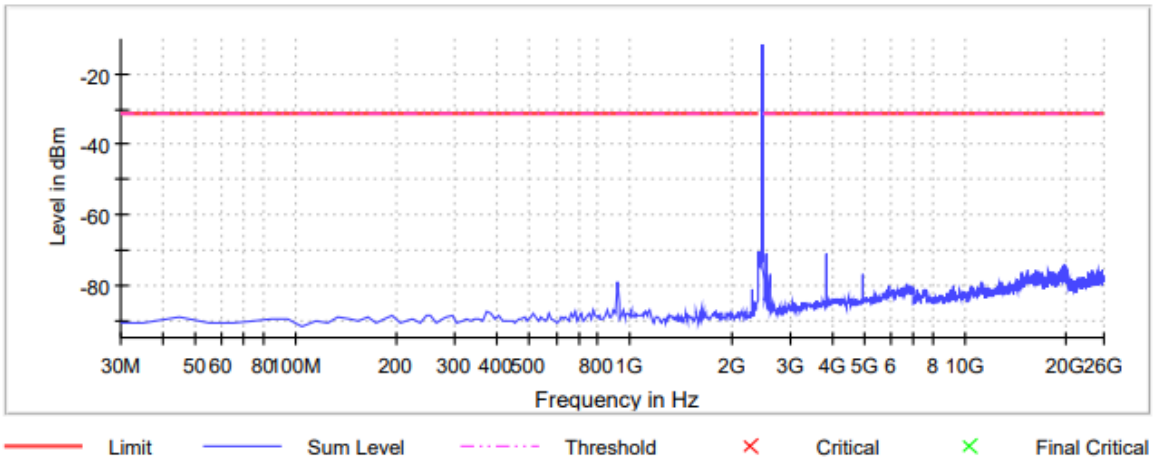


Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
5716.643965	-63.1	32.2	-31.0
5616.701339	-69.2	38.2	-31.0
2375.105042	-69.6	38.6	-31.0
5706.649703	-69.8	38.8	-31.0
3847.716851	-71.1	40.1	-31.0
2315.357143	-71.2	40.2	-31.0
5726.638228	-72.1	41.1	-31.0
5886.546430	-72.3	41.3	-31.0
5596.712813	-72.9	41.9	-31.0
5626.695601	-73.5	42.6	-31.0
5696.655440	-73.8	42.8	-31.0
19798.560030	-74.4	43.4	-31.0
5686.661177	-74.7	43.8	-31.0
19778.571504	-74.9	44.0	-31.0
20108.382172	-75.0	44.0	-31.0

TEST RESULTS (Cont.):	

High Channel:

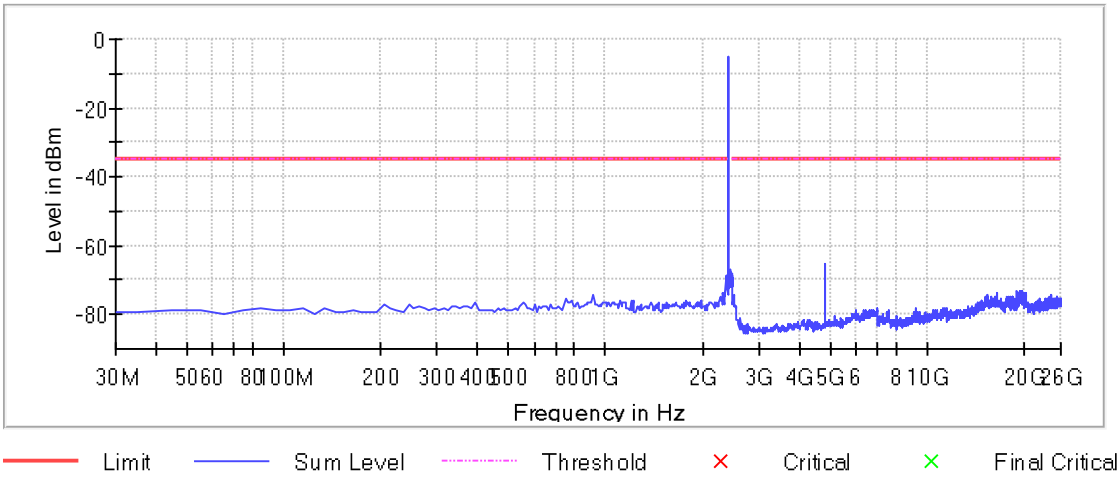


Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2538.468445	-71.3	39.9	-31.4
3847.716851	-71.3	39.9	-31.4
19788.565767	-74.2	42.8	-31.4
19778.571504	-74.4	43.1	-31.4
19748.588717	-74.6	43.2	-31.4
20128.370697	-74.6	43.3	-31.4
2488.497131	-74.6	43.3	-31.4
19818.548555	-74.9	43.5	-31.4
20108.382172	-75.0	43.7	-31.4
19838.537080	-75.0	43.7	-31.4
19408.783787	-75.1	43.8	-31.4
19828.542818	-75.2	43.9	-31.4
19388.795261	-75.3	43.9	-31.4
19738.594454	-75.5	44.1	-31.4
19798.560030	-75.6	44.2	-31.4

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02
TEST RESULTS:	PASS

Low Channel:

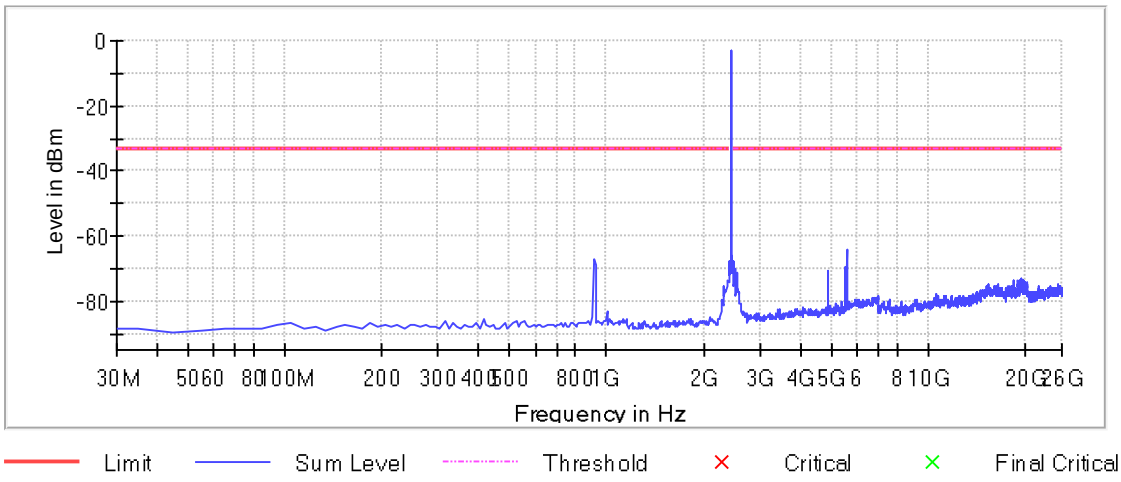


Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
4807.166065	-65.5	30.6	-34.9
2365.147059	-68.4	33.5	-34.9
2375.105042	-71.9	37.0	-34.9
2385.063025	-72.1	37.2	-34.9
19408.783787	-73.1	38.3	-34.9
19828.542818	-73.2	38.3	-34.9
19378.800999	-73.3	38.5	-34.9
19038.996069	-73.4	38.5	-34.9
20098.387909	-73.5	38.6	-34.9
19838.537080	-73.5	38.6	-34.9
19808.554292	-73.5	38.7	-34.9
2325.315126	-73.6	38.8	-34.9
19388.795261	-73.6	38.8	-34.9
19058.984594	-73.8	38.9	-34.9
19818.548555	-73.8	38.9	-34.9

TEST RESULTS (Cont.):	

Middle Channel:

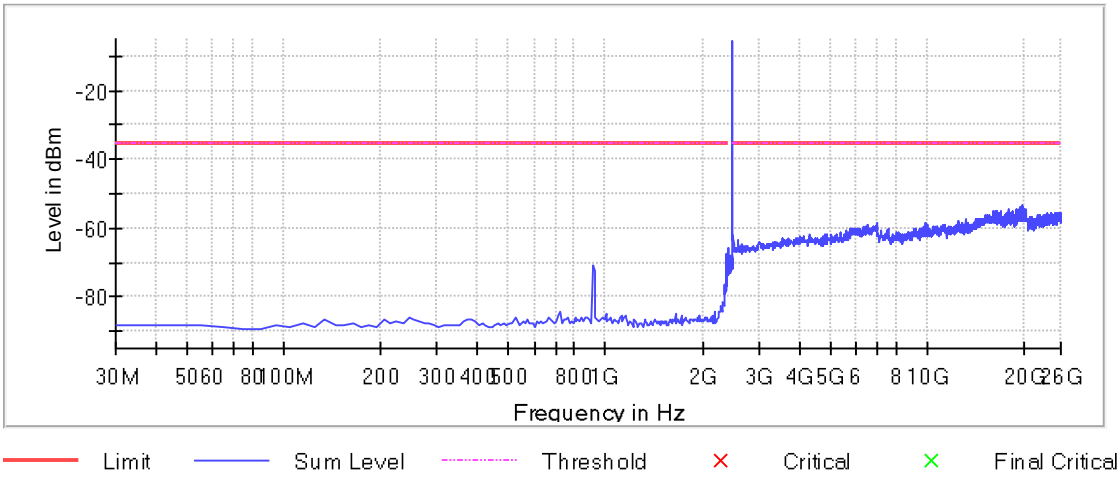


Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
5566.730025	-63.8	30.6	-33.2
911.281513	-67.0	33.7	-33.2
921.239496	-69.1	35.9	-33.2
5536.747238	-69.4	36.1	-33.2
5526.752975	-69.4	36.2	-33.2
5516.758712	-70.1	36.9	-33.2
2508.485657	-70.1	36.9	-33.2
4877.125903	-70.6	37.4	-33.2
5546.741500	-71.3	38.1	-33.2
2538.468445	-71.5	38.3	-33.2
4887.120166	-72.0	38.8	-33.2
2498.491394	-73.2	40.0	-33.2
19358.812473	-73.3	40.1	-33.2
19788.565767	-73.4	40.2	-33.2
19078.973119	-73.6	40.3	-33.2

TEST RESULTS (Cont.):	

High Channel:



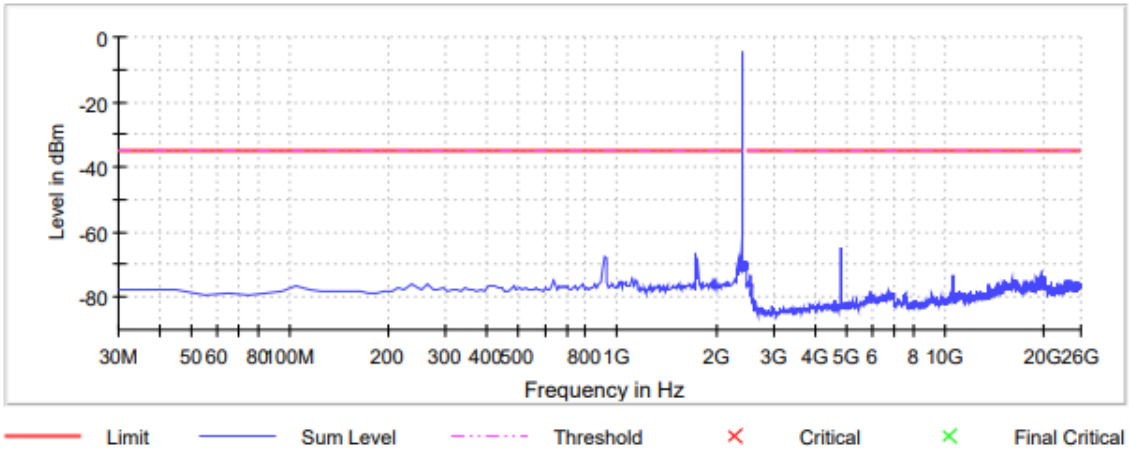
Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
19798.560030	-53.6	17.9	-35.6
19848.531343	-53.6	18.0	-35.6
19378.800999	-53.7	18.1	-35.6
19838.537080	-53.7	18.1	-35.6
19778.571504	-53.8	18.2	-35.6
19358.812473	-53.8	18.2	-35.6
19388.795261	-54.0	18.3	-35.6
19758.582979	-54.0	18.4	-35.6
19748.588717	-54.1	18.5	-35.6
19828.542818	-54.2	18.6	-35.6
19458.755100	-54.3	18.6	-35.6
19468.749363	-54.3	18.7	-35.6
19818.548555	-54.3	18.7	-35.6
19408.783787	-54.3	18.7	-35.6
20138.364960	-54.3	18.7	-35.6

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03
TEST RESULTS:	PASS

Frequency range 30 MHz – 26 GHz

Low Channel:

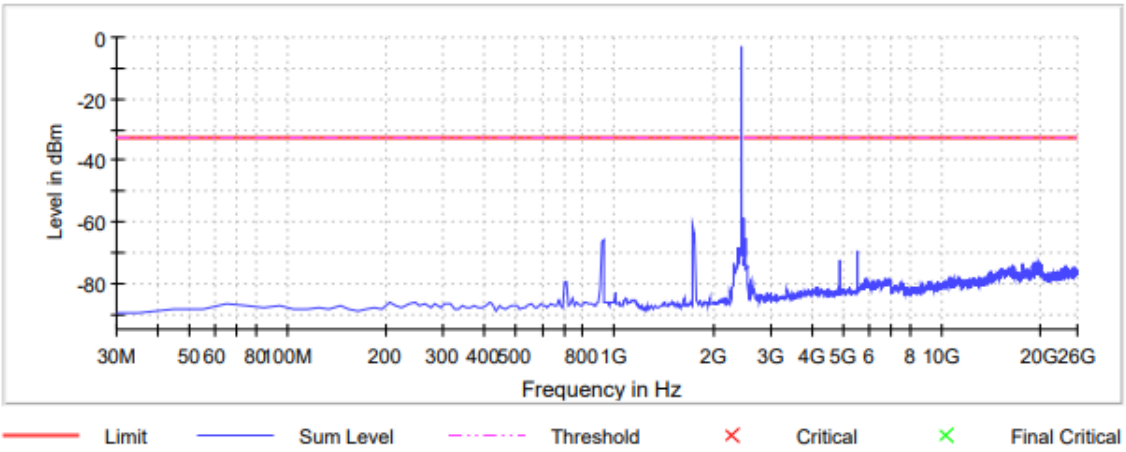


Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2395.021008	-60.8	26.1	-34.7
4807.166065	-64.7	30.0	-34.7
1737.794118	-66.5	31.8	-34.7
2365.147059	-67.0	32.3	-34.7
911.281513	-67.4	32.7	-34.7
1757.710084	-67.8	33.1	-34.7
921.239496	-68.3	33.6	-34.7
2335.273109	-68.6	33.9	-34.7
901.323529	-71.1	36.3	-34.7
2385.063025	-71.2	36.5	-34.7
2325.315126	-71.7	37.0	-34.7
2375.105042	-72.0	37.3	-34.7
19788.565767	-72.1	37.4	-34.7
2345.231092	-72.3	37.6	-34.7
19768.577242	-72.3	37.6	-34.7

TEST RESULTS (Cont.):	

Mid Channel:

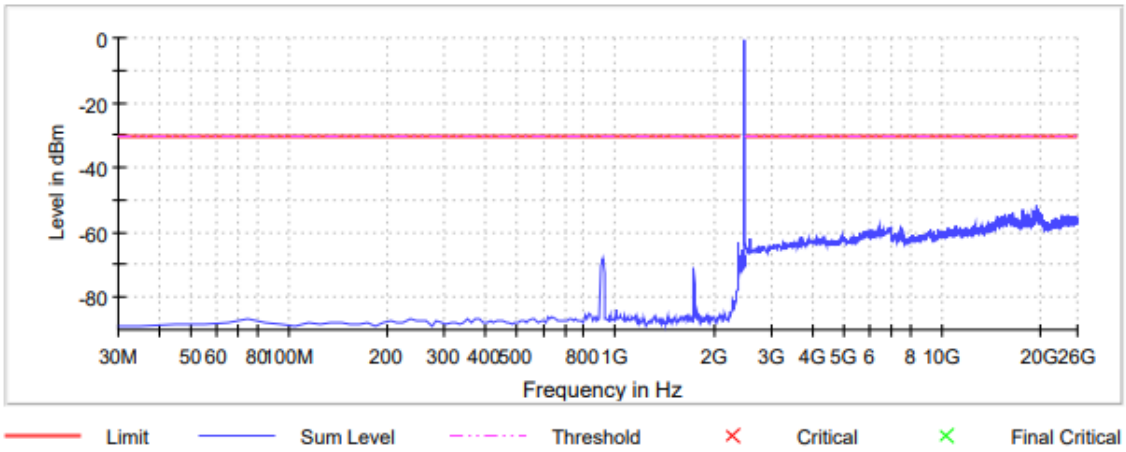


Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
1737.794118	-60.9	28.0	-32.9
1757.710084	-63.4	30.5	-32.9
1747.752101	-64.3	31.4	-32.9
2508.485657	-65.4	32.5	-32.9
921.239496	-66.0	33.1	-32.9
911.281513	-66.5	33.6	-32.9
2375.105042	-68.0	35.1	-32.9
5546.741500	-69.7	36.8	-32.9
2498.491394	-70.4	37.4	-32.9
4877.125903	-72.5	39.6	-32.9
19058.984594	-72.9	40.0	-32.9
19848.531343	-73.0	40.1	-32.9
19378.800999	-73.3	40.4	-32.9
5536.747238	-73.4	40.5	-32.9
2385.063025	-73.5	40.6	-32.9

TEST RESULTS (Cont.):	

High Channel:



Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
19358.812473	-52.0	21.6	-30.3
19768.577242	-52.6	22.3	-30.3
19348.818211	-53.0	22.7	-30.3
17739.741925	-53.1	22.8	-30.3
19058.984594	-53.5	23.1	-30.3
19778.571504	-53.6	23.2	-30.3
19808.554292	-53.6	23.3	-30.3
19828.542818	-53.6	23.3	-30.3
19818.548555	-53.6	23.3	-30.3
19038.996069	-53.7	23.4	-30.3
19408.783787	-53.7	23.4	-30.3
19888.508394	-53.7	23.4	-30.3
19848.531343	-53.8	23.4	-30.3
19798.560030	-53.8	23.5	-30.3
19838.537080	-53.8	23.5	-30.3

TEST A.7 EMISSION LIMITATIONS RADIATED (TRANSMITTER)

LIMITS:	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(d) and RSS-247 5.5

LIMITS

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c) / RSS-Gen):

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RSS-247. Attenuation below the general field strength limits specified in RSS-Gen is not required

TEST SETUP	

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at 3 m for the frequency range 30-1000 MHz (Bilog antenna) and for the frequency range 1-18 GHz (Double ridge horn antenna) and.at 1m for the frequency range 18-26 GHz (Double ridge horn antenna).

For radiated emissions in the range 18-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

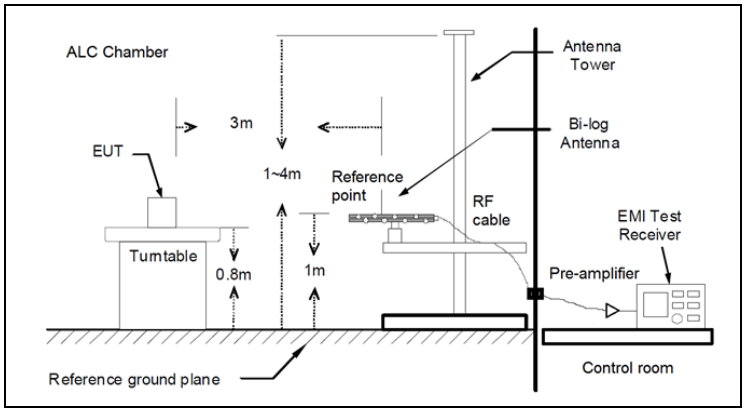
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

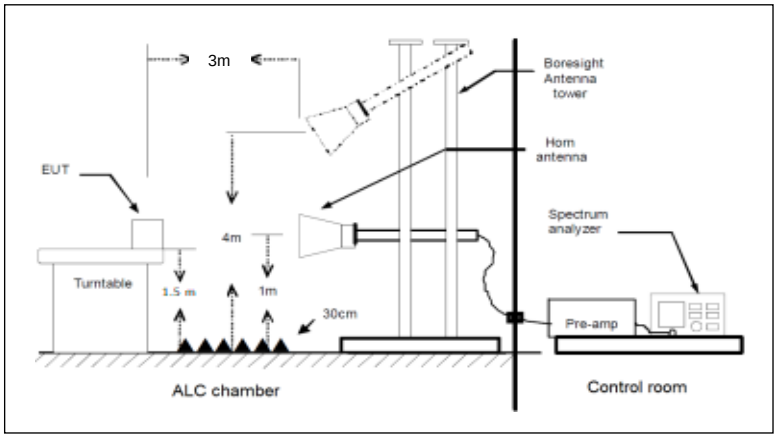
The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

TEST SETUP (CONT.)	

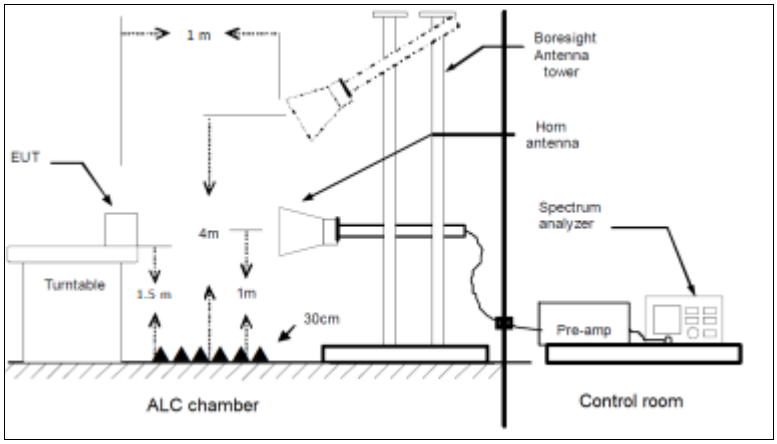
Radiated measurements Setup f < 1 GHz



Radiated measurements setup 1 < f < 18 GHz



Radiated measurements setup f > 18 GHz



TESTED SAMPLES:	S/02

TESTED CONDITIONS MODES:	TC#01 (GFSK)
TEST RESULTS:	PASS

Frequency range 30 MHz – 1000 MHz

The spurious emissions below 1 GHz do not depend on the operating channel selected in the EUT.

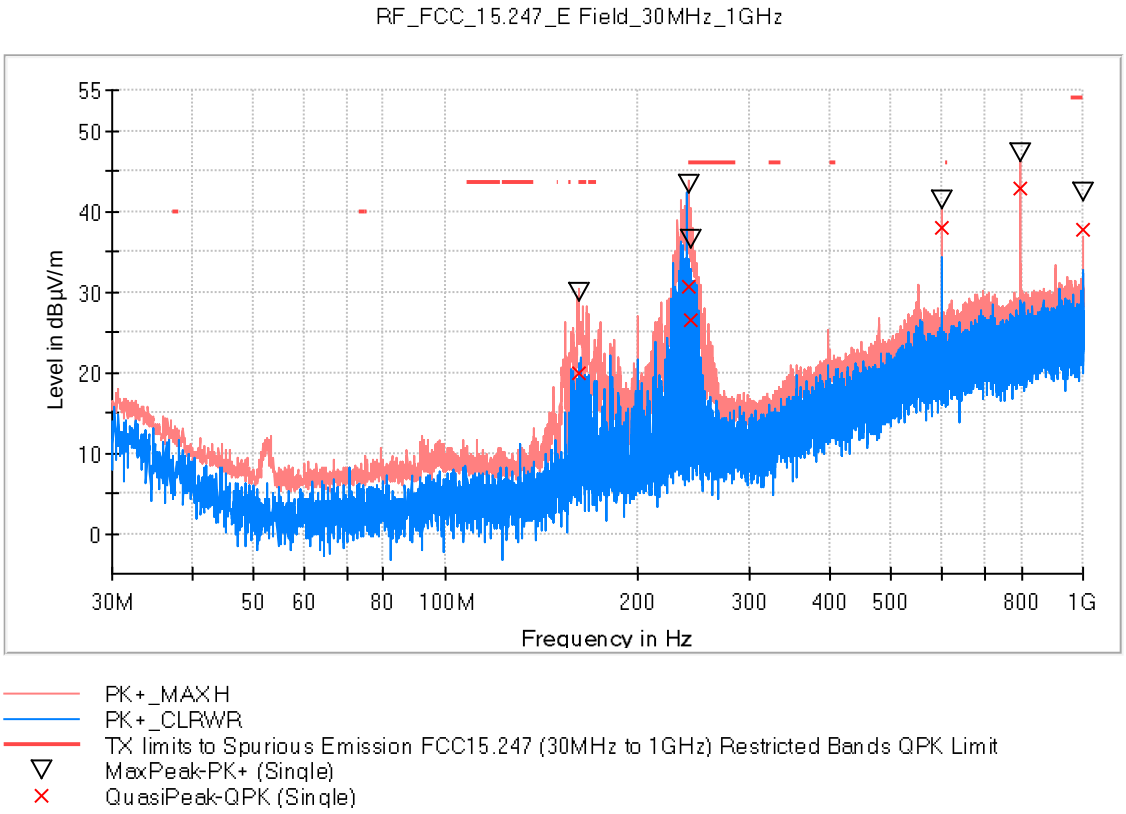
The results in the following plots and tables show the maximum measured levels in the 30-1000 MHz range.

Frequency range 1 GHz – 26 GHz

The results in the following plots and tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.5 GHz.

TEST RESULTS (Cont.):	30 MHz – 1000 MHz

Middle Channel

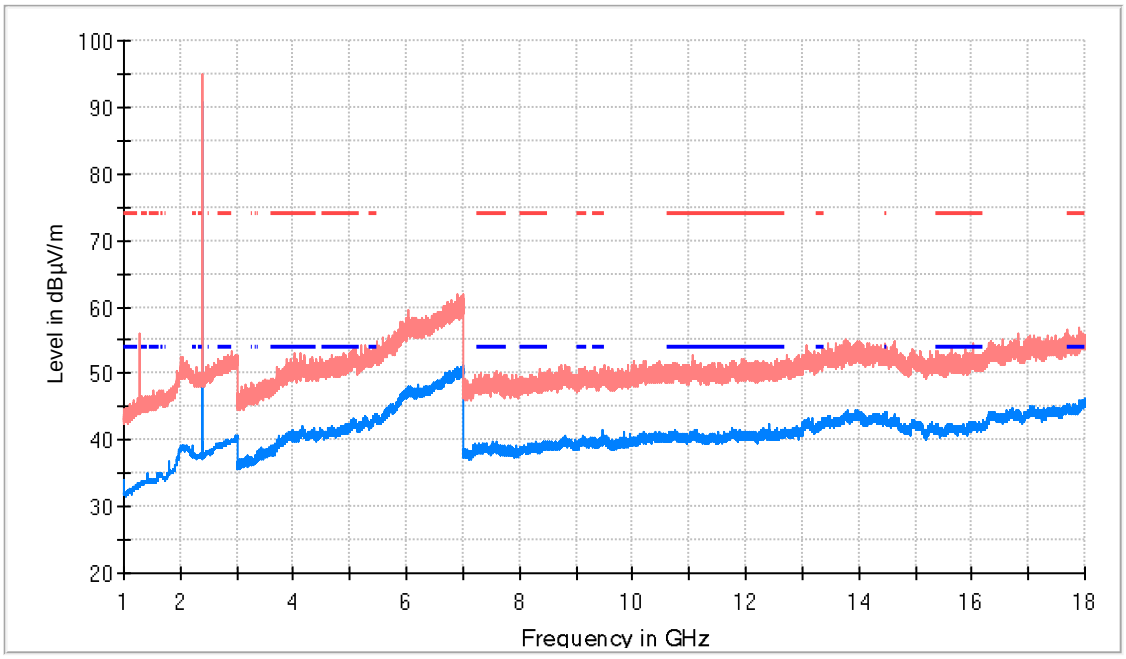


Maximizations

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Azimuth (deg)
161.871500	29.8	20.0	H	134.0
240.005000	43.3	30.7	H	180.0
243.012000	36.4	26.4	V	95.0
600.020500	41.4	37.9	V	0.0
797.997500	47.3	42.7	V	155.0
1000.000000	42.4	37.6	V	12.0

TEST RESULTS (Cont.)	1 GHz – 18 GHz

Lowest channel



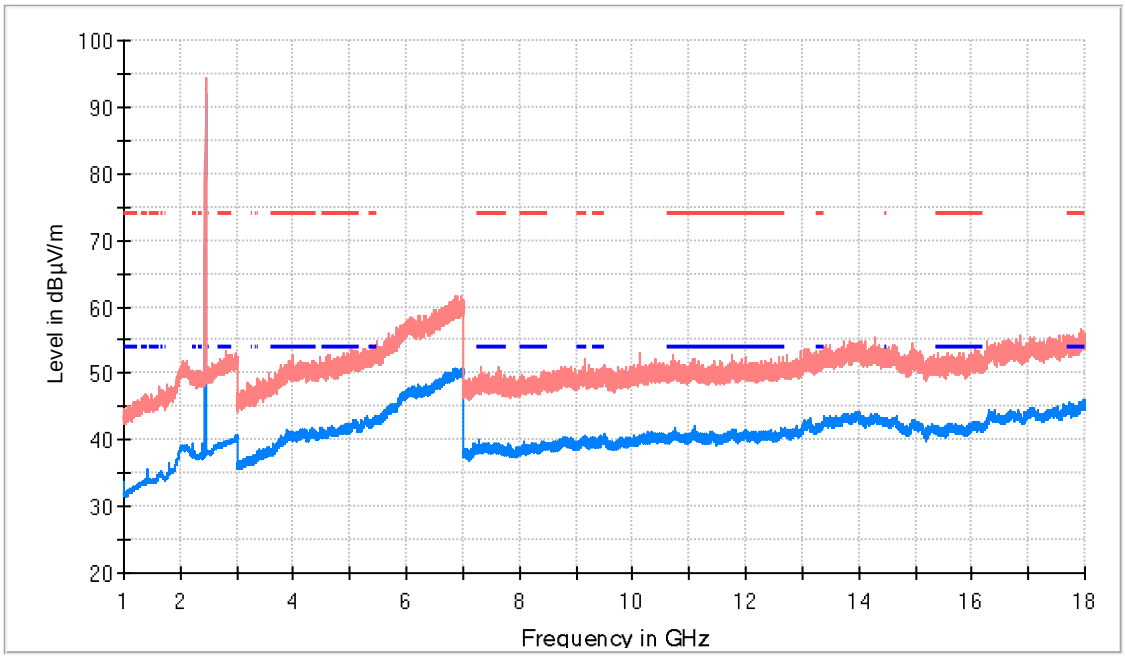
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comment
2402.000000	95.1	90.9	H	Fundamental
18000.000000	55.1	45.2	H	

TEST RESULTS (Cont.)	

Middle Channel

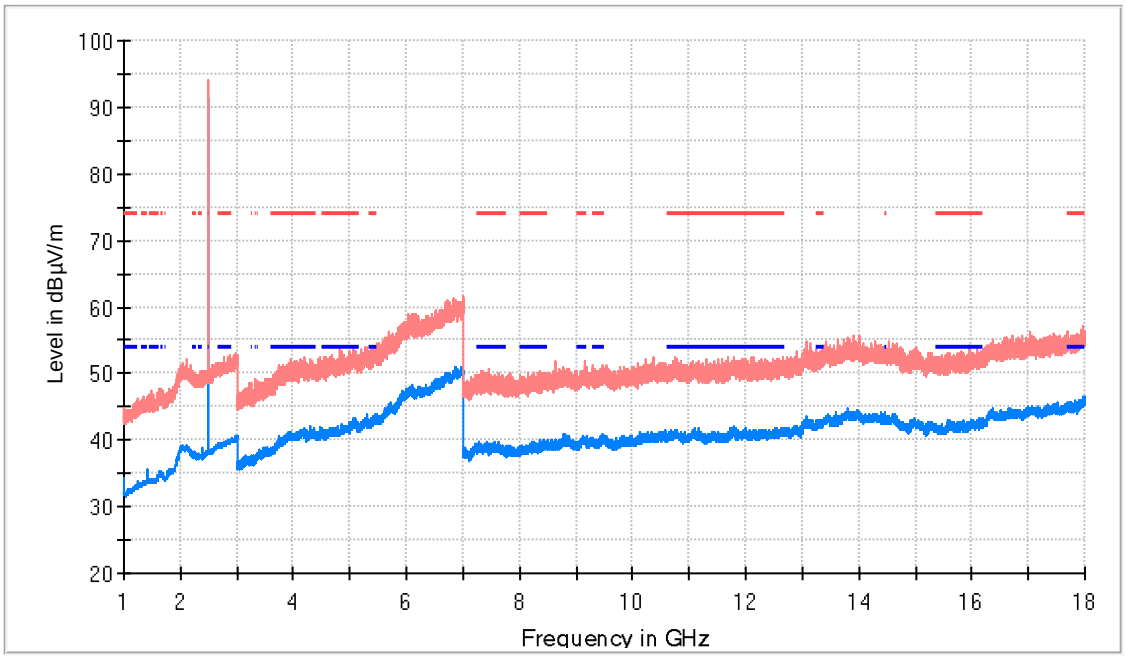


Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comment
2441.000000	94.5	91.9	H	Fundamental
18000.000000	55.8	45.2	H	

TEST RESULTS (Cont.)	

Highest Channel



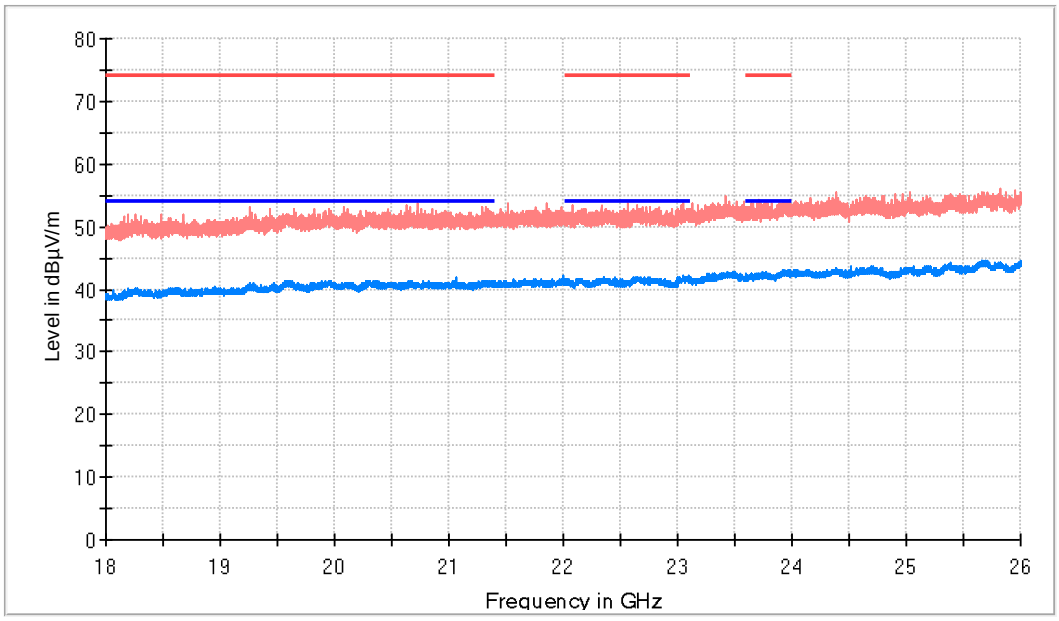
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Maximizations

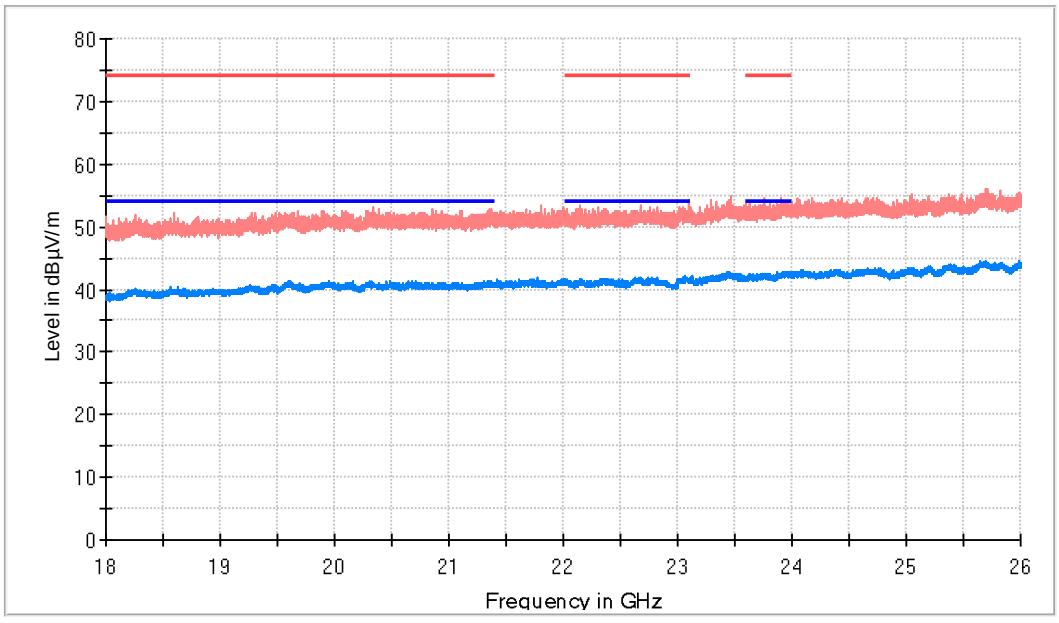
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comment
2480.000000	94.0	90.0	H	Fundamental
18000.000000	56.2	45.6	H	

TEST RESULTS (Cont.)	18 GHz – 26 GHz

Lowest Channel

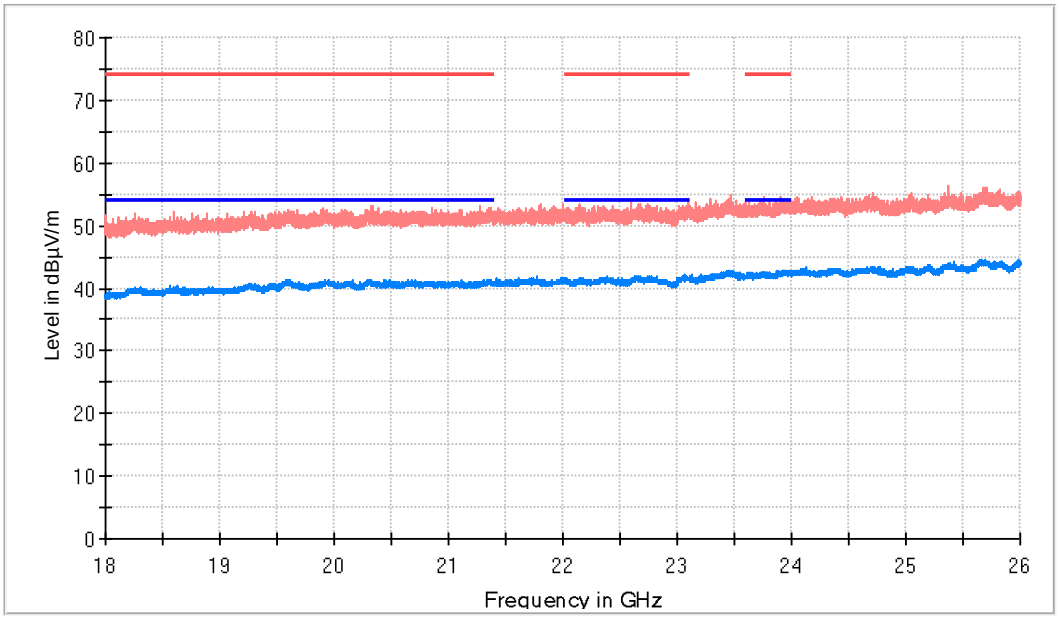


Middle Channel



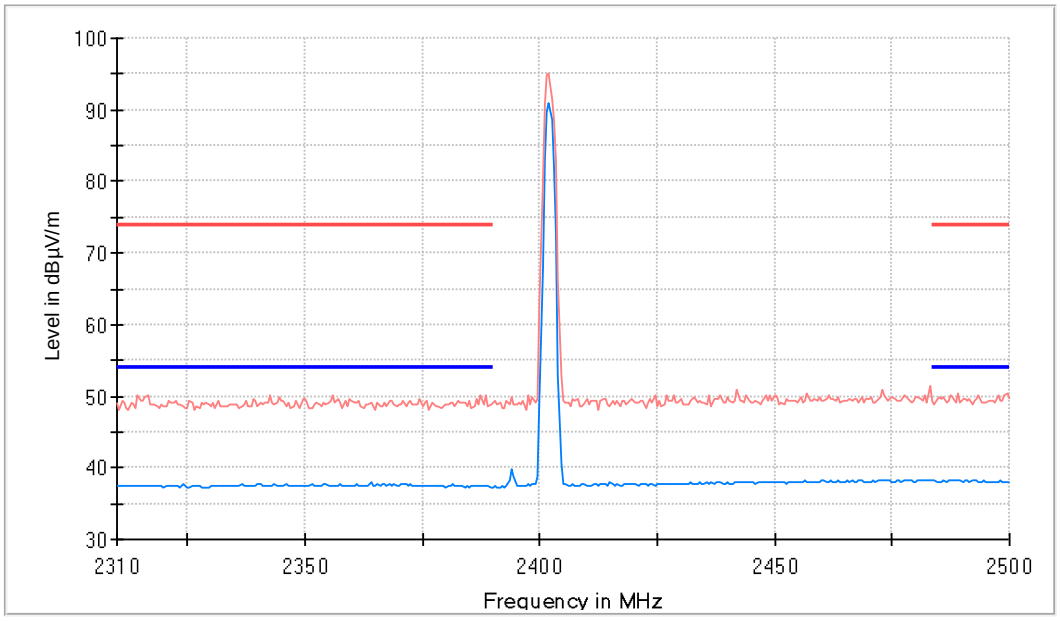
TEST RESULTS (Cont.)	

Highest Channel



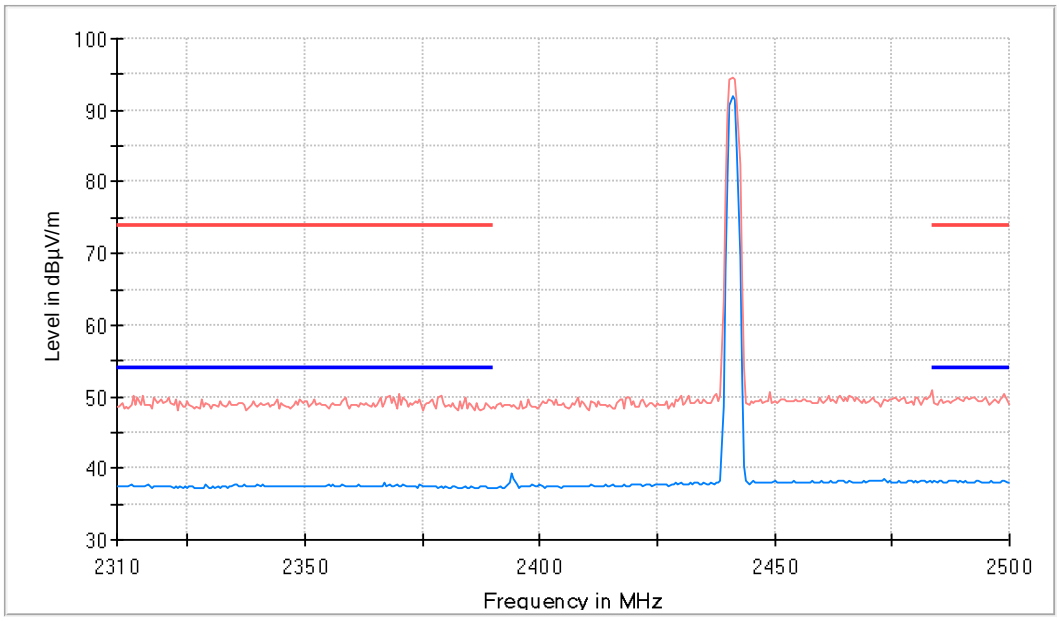
RESTRICTED BANDS	2.31 GHz – 2.5 GHz

Lowest Channel



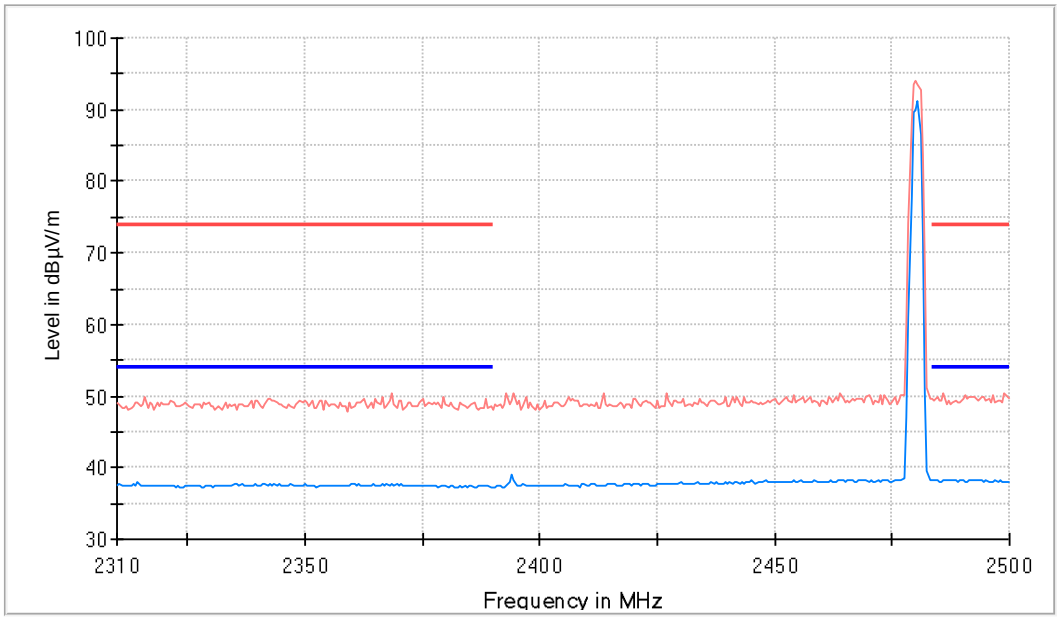
TEST RESULTS (Cont.)	

Middle Channel



AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Highest Channel



AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

TESTED SAMPLES:	S/02
TESTED CONDITIONS MODES:	TC#02 (π/4-DQPSK)
TEST RESULTS:	PASS

Frequency range 30 MHz – 1000 MHz

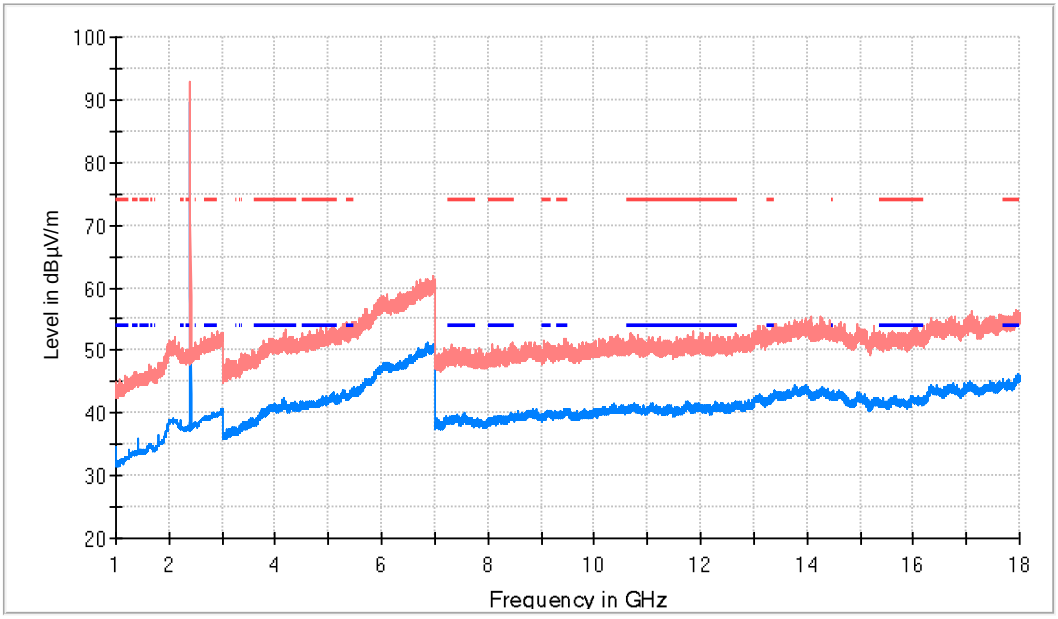
The spurious emissions below 1 GHz do not depend on the operating channel selected in the EUT. GFSK Modulation was identified as a worst case.

Frequency range 1 GHz – 26 GHz

The results in the following plots and tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.5 GHz.

TEST RESULTS (Cont.)	**1 GHz – 18 GHz**

Lowest Channel

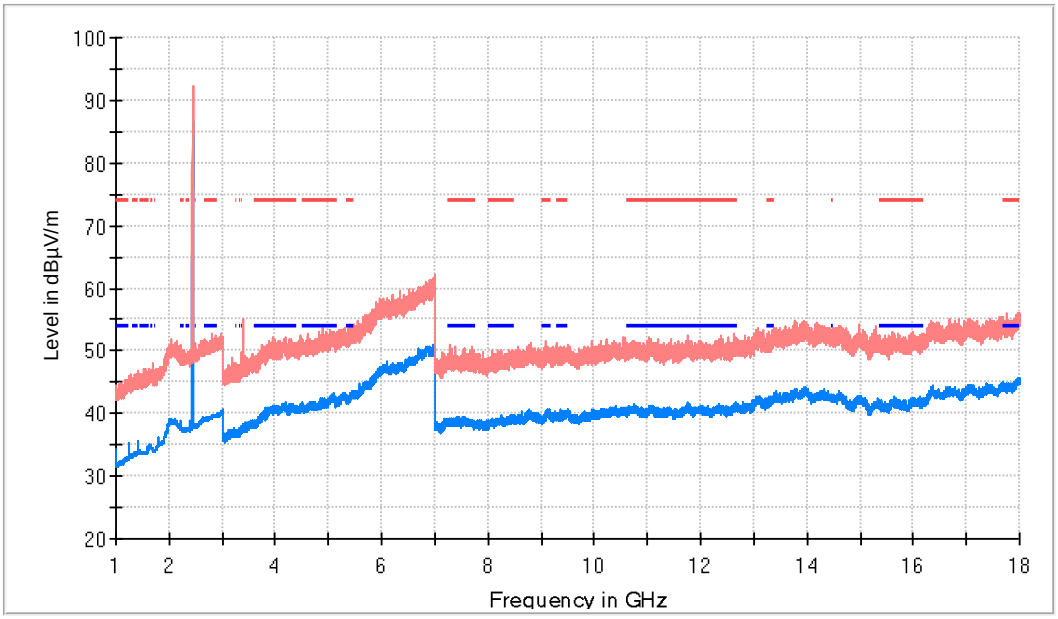


Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comment
2403.000000	92.8	89.7	H	Fundamental
18000.000000	55.3	45.4	H	

TEST RESULTS (Cont.)	

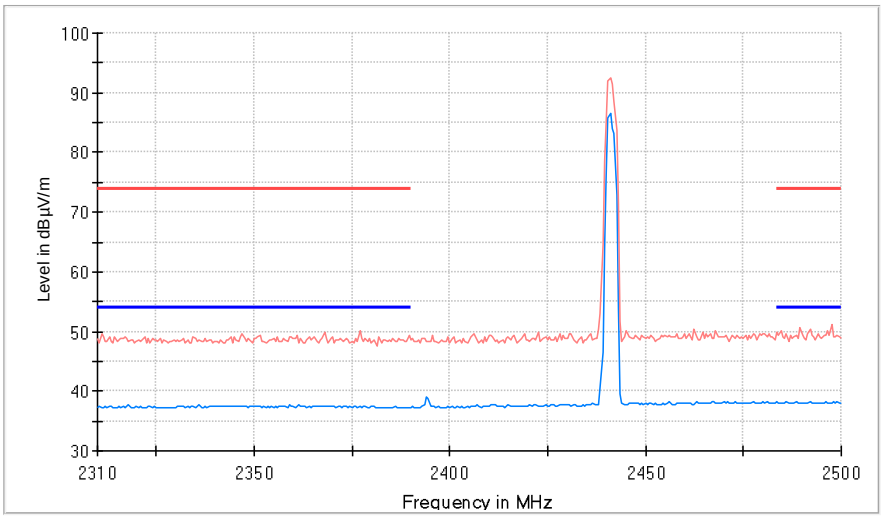
Middle Channel



AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Maximizations

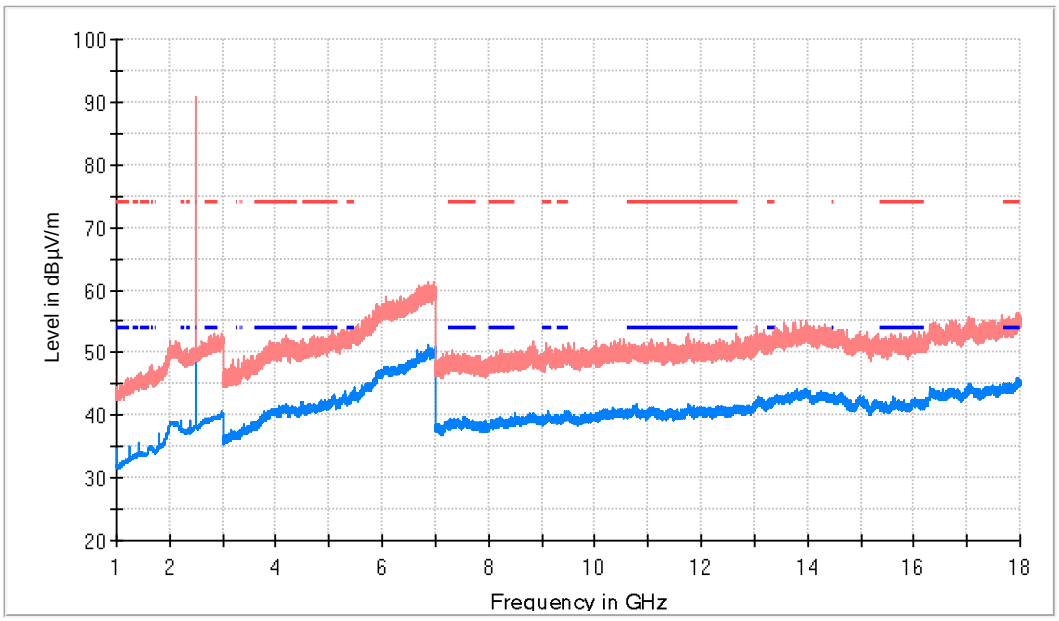
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comment
2441.000000	92.4	86.6	H	Fundamental
18000.000000	55.3	45.7	H	Fundamental



AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

TEST RESULTS (Cont.)	

Highest Channel



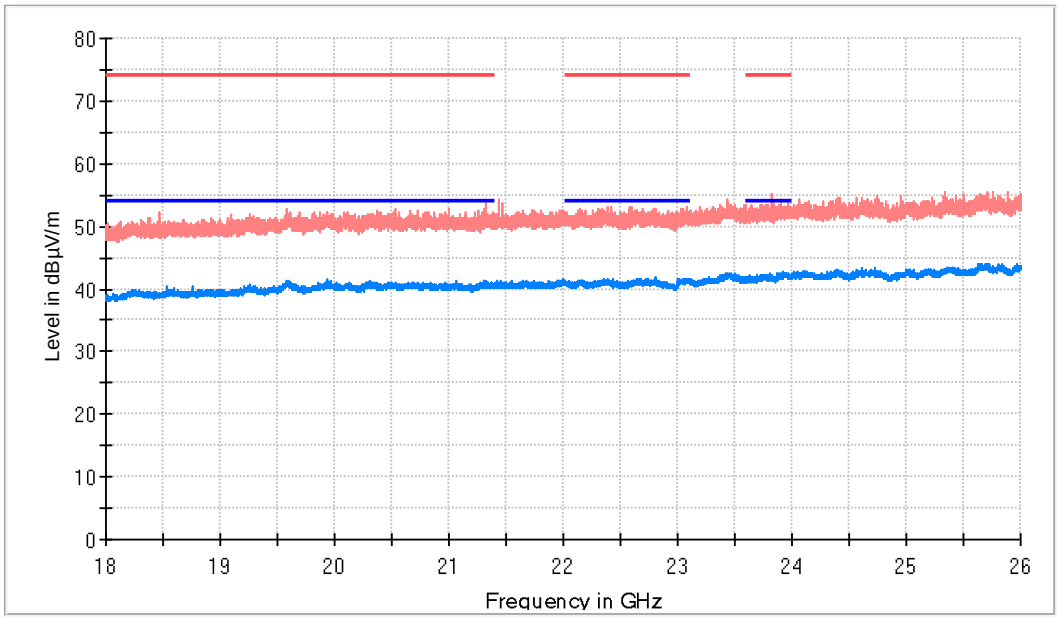
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Maximizations

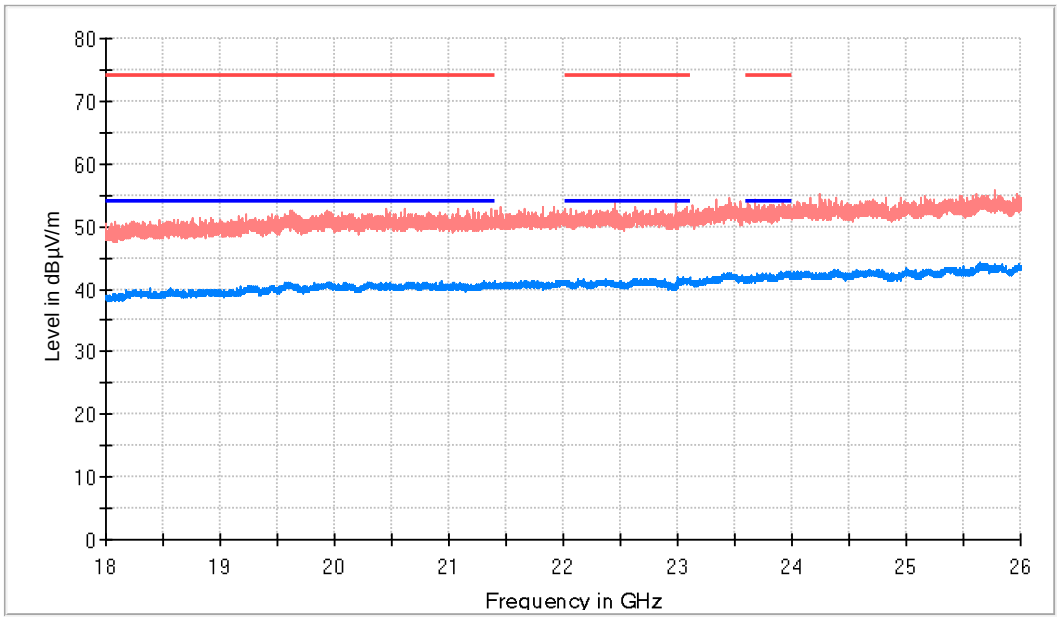
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comment
2480.500000	90.8	86.7	H	Fundamental
18000.000000	55.6	45.3	H	

TEST RESULTS (Cont.)	18 GHz – 26 GHz

Lowest Channel

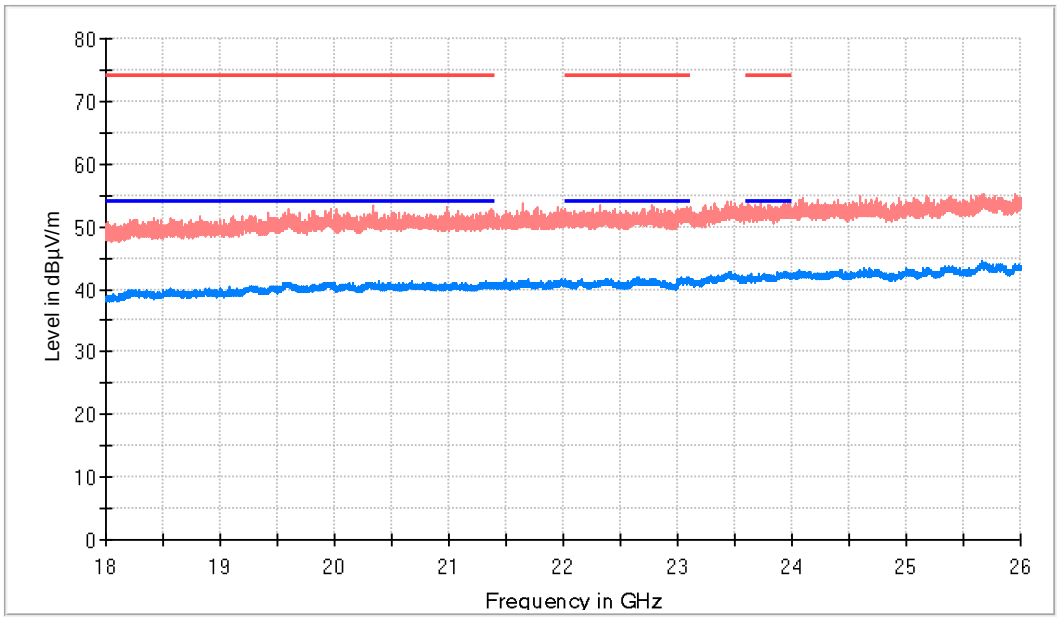


Middle Channel



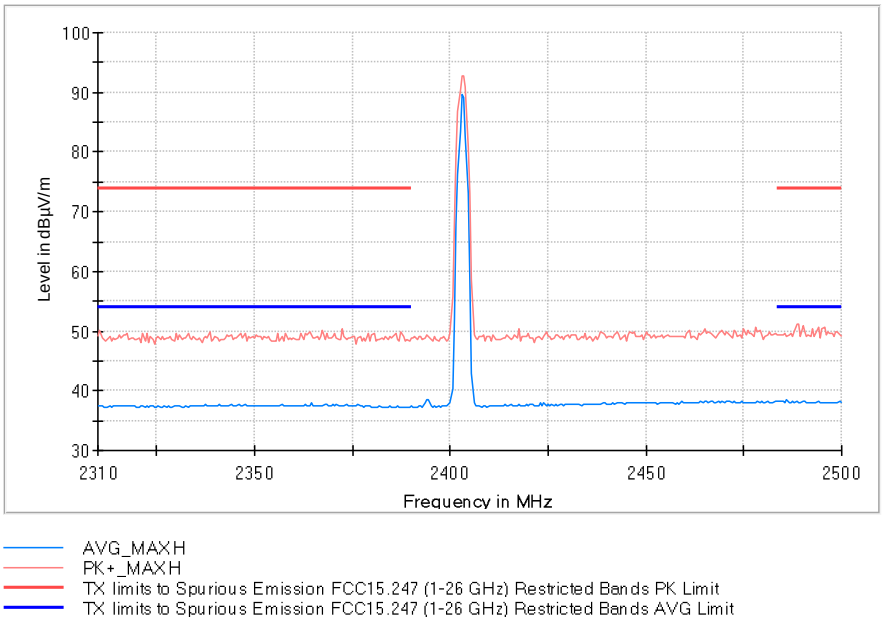
TEST RESULTS (Cont.)	

Highest Channel



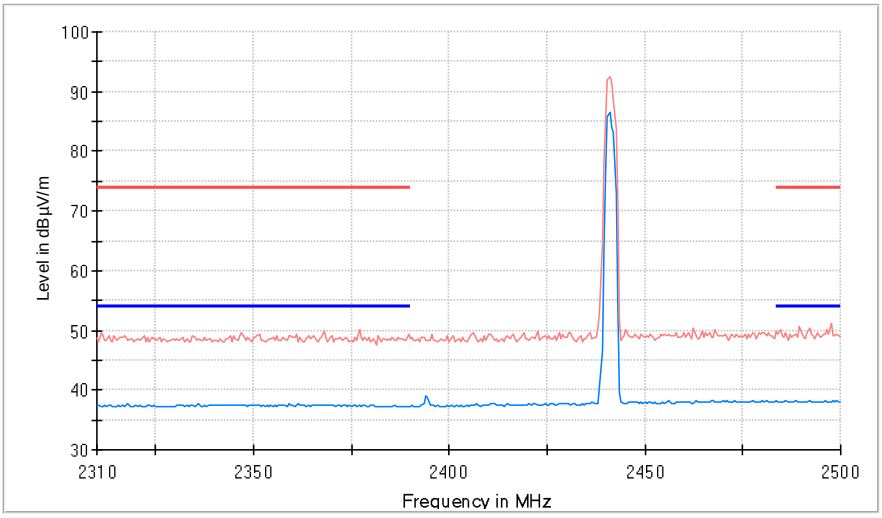
TEST RESULTS (Cont.):	RESTRICTED BAND 2.31 GHz – 2.5 GHz

Lowest Channel

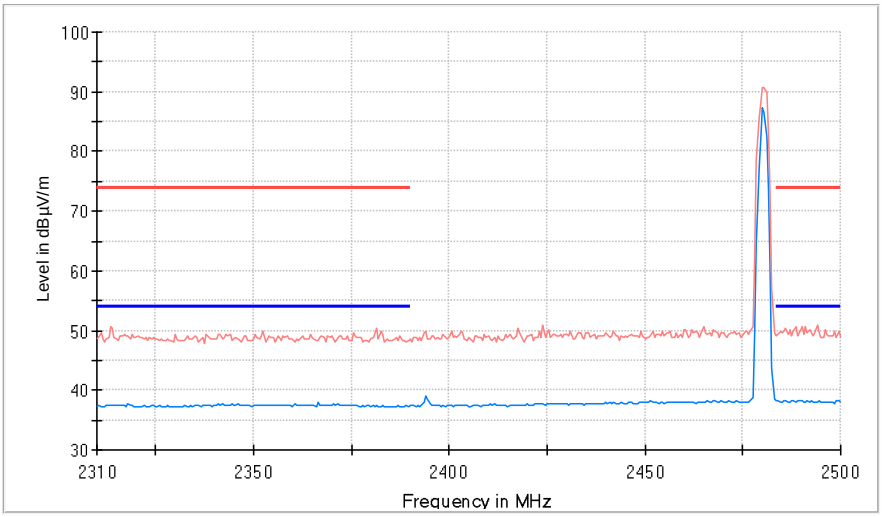


TEST RESULTS (Cont.)	

Middle Channel



Highest Channel



TESTED SAMPLES:	S/02
TESTED CONDITIONS MODES:	TC#03 (8DPSK)
TEST RESULTS:	PASS

Frequency range 30 MHz – 1000 MHz

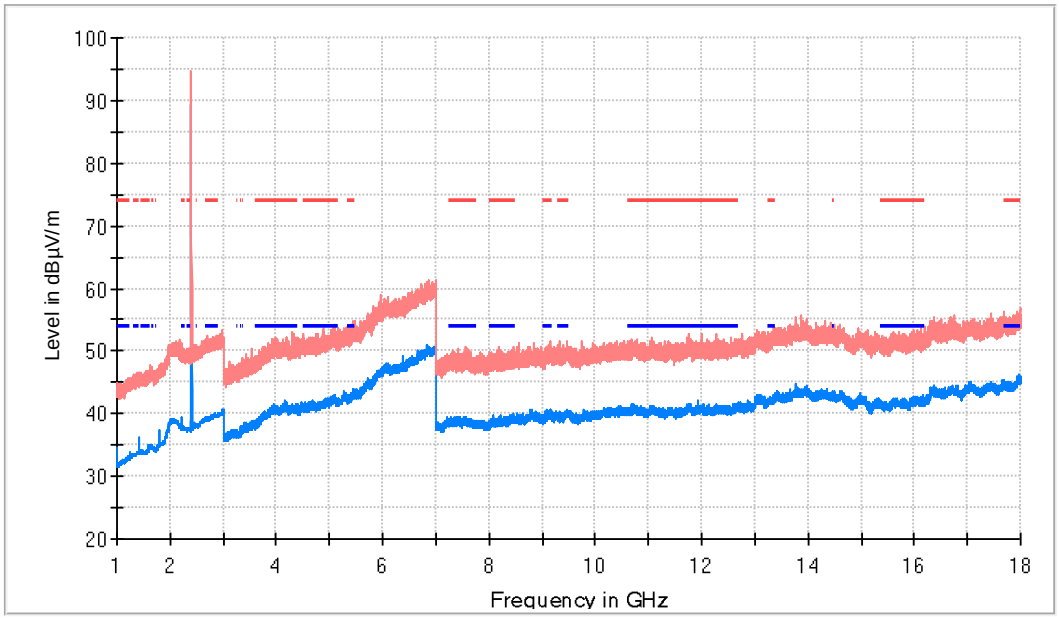
The spurious emissions below 1 GHz do not depend on the operating channel selected in the EUT. GFSK modulation was selected as a worst case.

Frequency range 1 GHz – 26 GHz

The results in the following plots and tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.5 GHz.

TEST RESULTS (Cont.)	**1 GHz – 18 GHz**

Lowest Channel

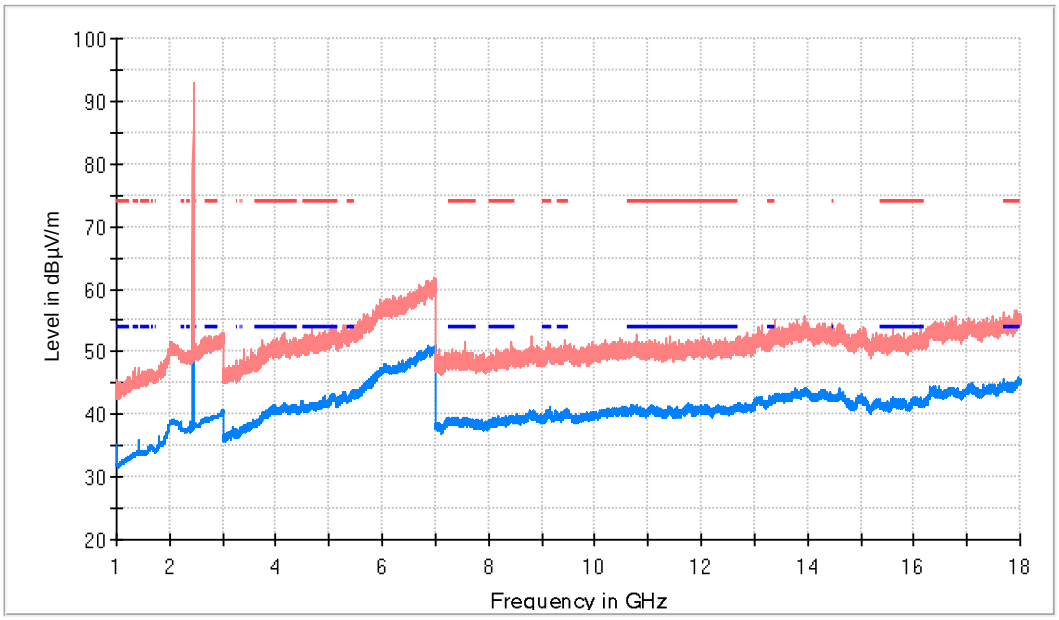


Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comment
2403.000000	94.8	87.4	H	Fundamental
18000.000000	55.1	45.3	H	

TEST RESULTS (Cont.)	

Middle Channel



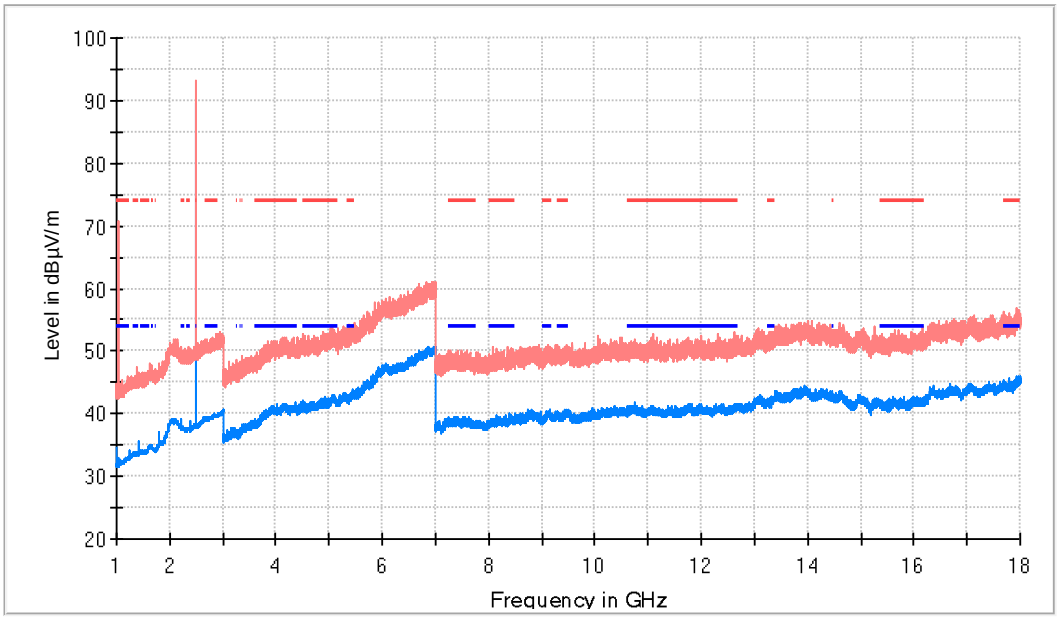
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comment
2441.000000	93.0	87.3	V	Fundamental
18000.000000	54.4	45.3		

TEST RESULTS (Cont.)	

Highest Channel



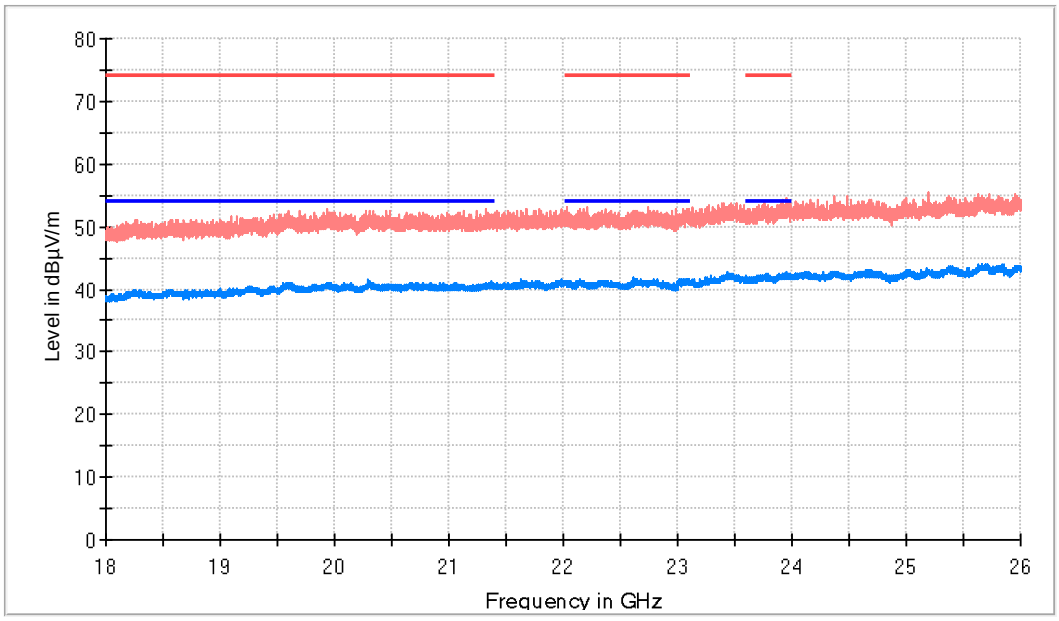
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Comment
2480.500000	93.3	89.7	H	Fundamental
18000.000000	54.6	45.5	V	

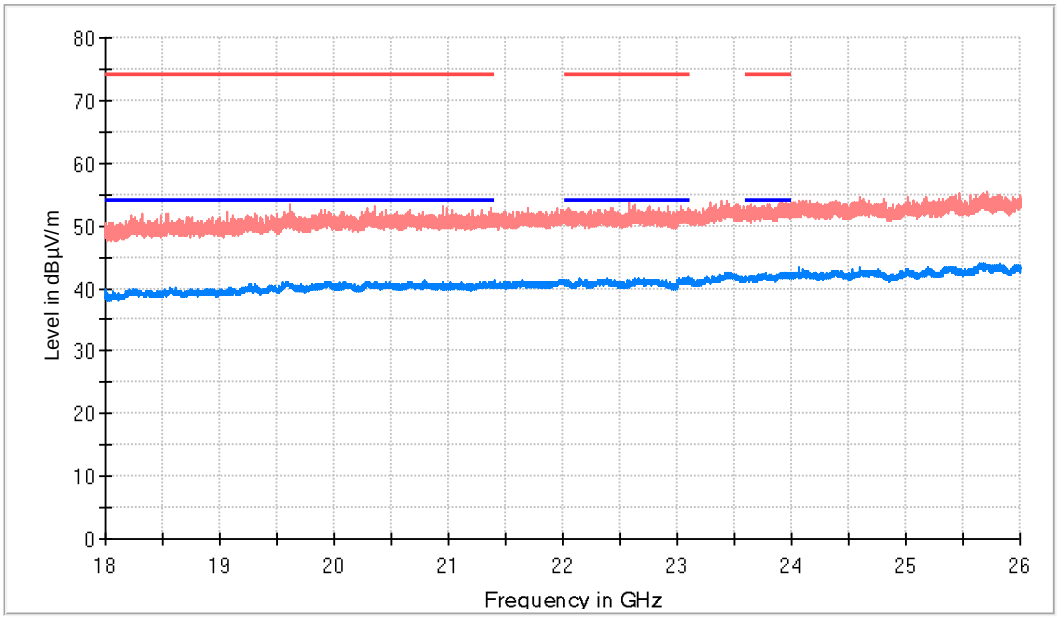
TEST RESULTS (Cont.)	18 GHz – 26 GHz

Lowest Channel



AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

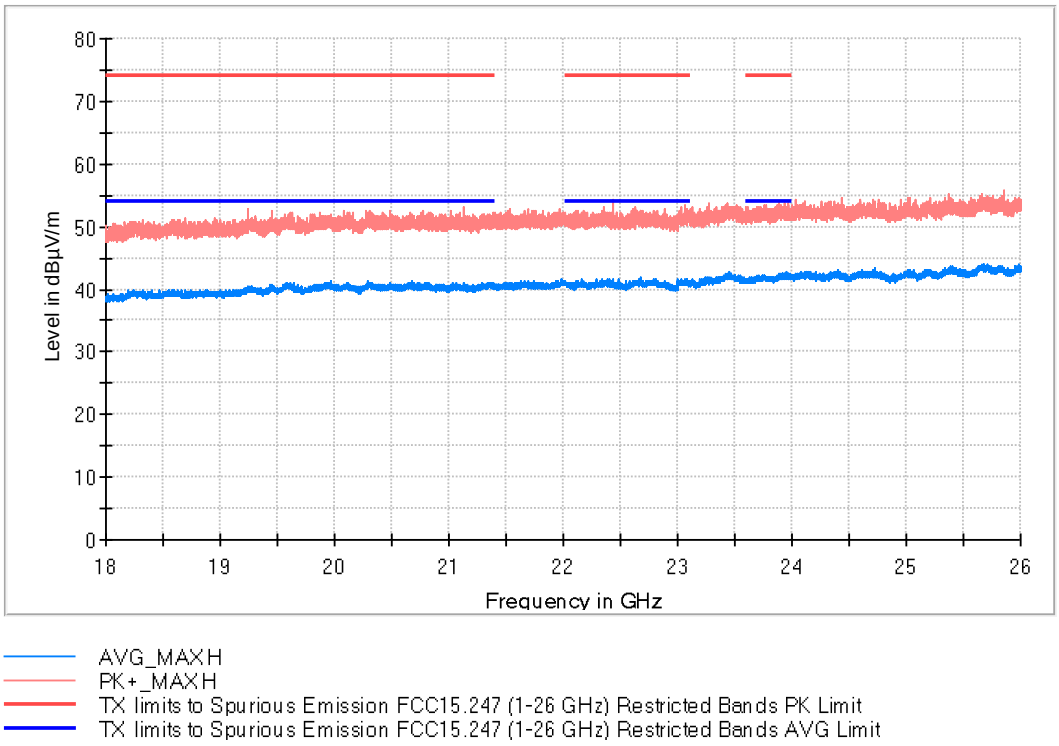
Middle Channel



AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

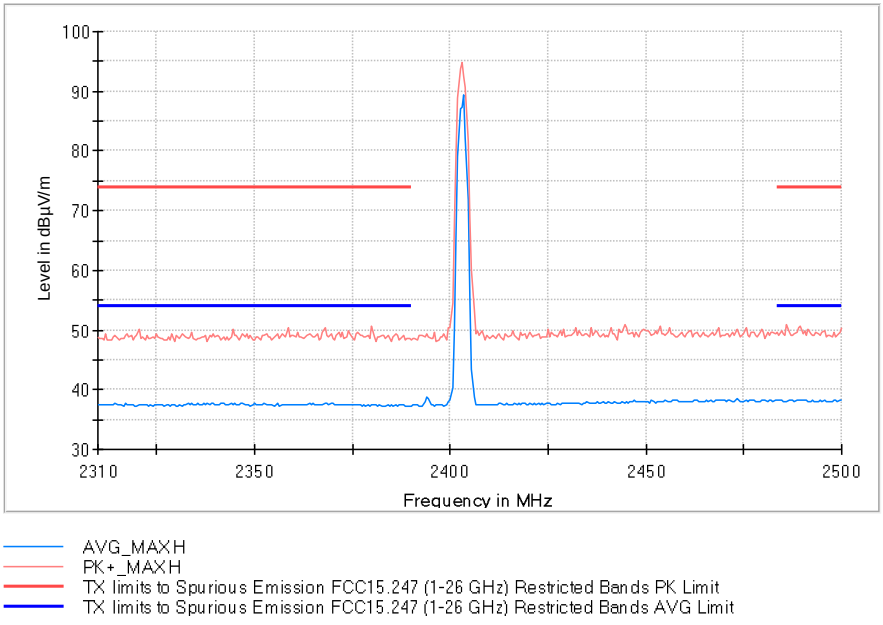
TEST RESULTS (Cont.)	

Highest Channel



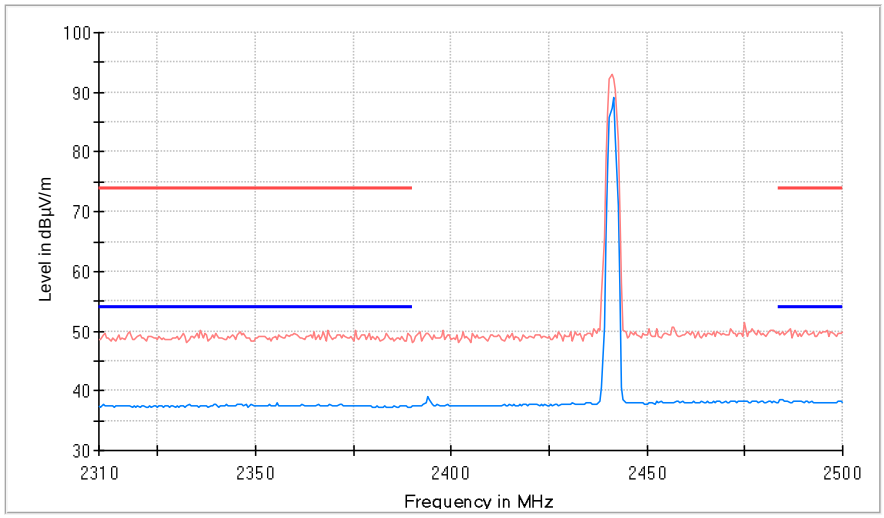
RESTRICTED BANDS	2.31 GHz – 2.5 GHz

Lowest Channel



TEST RESULTS (Cont.)	

Middle Channel



Highest Channel